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ABSTRACT

The papers included in this volume are part of a programmatic investigation involving the evaluation of treatments for drug abuse. The studies are based on treatment outcome criteria for the patient sample representing all admissions during year 3 (June 1, 1971 to May 31, 1972) of the Drug Abuse Reporting Program (DARP). The overall strategy of the research program involves a series of studies which include: (1) descriptive and analytic studies of the DARP population; (2) taxonomic studies of patients, treatments, and outcomes; (3) evaluation studies, based on during-treatment outcomes; and (4) evaluation studies, based on post-treatment criteria. These studies represent the contributions of a large number of individuals from which group nine papers were selected for this major report. (Author/PC)

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STUDIES OF THE EFFECTIVENESS OF TREATMENTS FOR DRUG ABUSE, BASED ON THE DRUG ABUSE REPORTING PROGRAM (DARP): 1974

Symposium and Papers Presented at the meeting of the
American Psychological Association
New Orleans, September, 1974

by the

TCU-IBR Research Staff on
Drug Abuse Treatment Evaluation

Based on the Joint NIDA-TCU Drug Abuse Reporting Program (DARP)
Research on Evaluation of Treatments for Drug Abuse
HSH Contract Nos. 42-69-6 and 42-72-132

September, 1974

IBR Report 74-26

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The Joint NIDA-TCU Drug Abuse Reporting Program (DARP)
Research on Evaluation of Treatments for Drug Abuse,
HSM Contract Nos. 42-69-6 and 42-72-132

Papers presented at:

American Psychological Association
New Orleans, September, 1974

Symposium: Studies of the Effectiveness of Treatments for Drug Abuse, based on the Drug Abuse Reporting Program (DARP)

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Presentations by: S. B. Sells
D. Dwayne Simpson
George W. Joe
Steven G. Cole
Lawrence R. James
Robert G. Demaree
Richard L. Gorsuch (IBR)

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Individual papers: Olive Watterson
Gary L. Long

September, 1974

IBR Report 74-26

Preface

The papers included in this volume are part of a programmatic investigation involving the evaluation of treatments for drug abuse. The present studies are based on treatment outcome criteria for the patient sample representing all admissions during Year 3, June 1, 1971 to May 31, 1972, of the Drug Abuse Reporting Program (DARP). The DARP file is a computerized file of patient background, treatment, and outcome information designed as a data base for treatment evaluation research. It was initiated in June 1969, and reporting of new admissions was discontinued in March 1973. During its operating life, the DARP collected Admission Reports on approximately 44,000 patients admitted to treatment over the 4 years to 52 agencies located throughout the United States and in Puerto Rico. The bimonthly Status Evaluation Report (covering treatment received and patient outcome data) continued for each patient up to termination from treatment; however, reporting of these data was discontinued as of March 31, 1974 (Report Period 29), allowing a full year of reports to accumulate for the patients admitted in the last admission period (Report Period 23, February-March, 1973).

The DARP program began with six agencies reporting, in June of 1969. At the end of Year 1 there were 3134 patients from 13 agencies. Year 2 showed considerable growth and ended with 8251 patient records from 23 agencies. In Year 3 the number of agencies increased to 36 and 15,799 new patient records were added. Year 4, the final year, consisted of only 10 months for DARP admissions; during this year there were approximately 16,750 admissions from 52 agencies. An exact count of admissions in Year 4 is not yet available. For the purposes of the major treatment evaluation analyses, these data have been analyzed as three cohorts. Cohort 1 includes the 11,385 patients admitted

during Years 1 and 2. Cohort 2 consists of the 15,799 Year 3 admissions, and Cohort 3, the Year 4 admissions, approximately 16,750.

The overall strategy of this research program involves a series of studies for each of the three cohorts. These can be divided into four types of studies, as follows:

I. Descriptive and analytic studies of the DARP population.
II. Taxonomic studies of patients, treatments, and outcomes.
III. Evaluation studies, based on during-treatment outcomes.
IV. Evaluation studies, based on post-treatment criteria.

As of June 1973, studies of Types I, II, and III have been completed for Cohort 1.

The Type I studies include those by Spiegel (1973) on the population description, Simpson and McRae (1973) on readmissions, Joe (1973a) on patient background indices, Simpson (1973) on the relations of drug and alcohol use, and those by Sells, Chatham, and Retka (1972) and Watterson, Sells, and Simpson (1973) on addict death rates and causes of death.

The Type II studies include one by Simpson (1972) on a taxonomy of drug use patterns, another by McRae (1973) on a patient typology, one by Watson, Simpson, and Spiegel (1973) on a treatment typology, and the fourth by Demaree (1973) on development of criterion measures and scales.

Three evaluation studies (Type III) were also completed for Cohort 1. These are by Joe, Person, Sells, and Retka (1972), Joe (1973b), on patient retention, and Spiegel and Sells (1973), the major evaluation study that incorporated elements of many of the other studies in its design.

In addition to the technical reports, all of these studies have been included in a two-volume publication edited by Sells (1974).

The complete list of Cohort 2 studies is very similar to that for Cohort 1, as shown in the following outline:

Type I.	1.	A developmental model of drug use and addiction based on literature review.	Gorsuch and Butler

	2.	Population description, admissions during Periods 16 through 23.	Butler
	3.	Description of the DARP Population for all 4 years, using indices and composite variables.	Curtis, Simpson and Joe
	4.	Death rates and causes of death for Year 4 sample.	Watterson, Sells, and Simpson
Type II.	5.	Taxonomy of drug use patterns, Years 3 and 4.	Simpson
	6.	Patient classification study, all 4 years.	Joe and Simpson
	7.	Treatment typology for Year 3 sample.	Cole
	8.	Treatment classification by cluster analysis of site visit report data, Year 3 sample.	James and Hammond
	9.	Criterion measures and scales for Year 3.	Demaree and Neman
Type III.	10.	Path analysis of during-treatment outcomes, Year 3.	Demaree, Neman, Gant, and Long
	11.	Retention in treatment, Year 3, by patient type and treatment.	Joe and Simpson
	12.	Evaluation of treatment Year 3, by patient type, treatment, and time in treatment.	Gorsuch, Abbamonte, and Sells

The Symposium papers and the additional papers by Watterson, Simpson and Sells and by Long and Demaree, are in effect condensations of the major monograph reports listed above and the authors are the responsible investigators of major studies selected for inclusion in this Symposium.

These studies represent the contributions of a large number of individuals. More complete recognition is provided in the listing of the drug research staff and the IBR Drug Abuse Publications, particularly the DARP research reports which represent the basis of the present papers.

The work upon which these studies were based was performed pursuant to contracts No. HSM-42-72-132 and No. HSM-42-69-6, with the National Institute on Drug Abuse, Department of Health, Education, and Welfare (formerly supported by the National Institute of Mental Health).

The interpretations and conclusions presented in this report do not necessarily reflect the position of the National Institute on Drug Abuse or the Department of Health, Education, and Welfare.

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The DARP Research Program and Data System

S. B. Sells

The research on evaluation of the effectiveness of treatments for drug abuse, which is the subject of this symposium, is a multifaceted program of data base management and substantive research involving the Drug Abuse Reporting Program (DARP). The DARP was established in 1969 by the National Institute of Mental Health (NIMH) at the Institute of Behavioral Research (IBR), Texas Christian University, to provide a data base for research on the evaluation of treatments for drug abuse. One major set of research reports, completed in 1973, has already been published and is related to outcomes during treatment of a cohort of 11,385 patients admitted to treatment at 23 Federally supported treatment agencies between June 1, 1969 and May 31, 1971. The presentation today focuses mainly on the second wave of studies, completed within the past few months, involving a cohort of 15,831 patients admitted to 36 agencies between June 1, 1971 and May 31, 1972. It is my responsibility to develop a context for the remaining papers by explaining the DARP research program and the data system on which it is based.

The DARP was developed in 1968 under a grant administered by the Division of Narcotics and Drug Abuse and pretested in late 1968 and early 1969. Data collection began formally in June, 1969 under a contract administered by the Narcotic Addict Rehabilitation Branch (NARB) and has continued for more than 5 years through the transition to the National Institute on Drug Abuse (NIDA). In 1971 a second contract under NARB authorized the implementation of the evaluation research. These activities have reflected a close working relationship between the NARB and IBR staffs that undoubtedly contributed to the productivity of the program. The cooperation of personnel throughout the agencies that comprised the reporting network further reflects the serious concern of a large number of people, in government and at the treatment

agencies, for the objective evaluation of treatment. As of August 1, 1974, the posttreatment evaluation of the two cohorts mentioned earlier has been implemented by a NIDA grant and field work to locate and interview substantial samples of both groups is being set in motion, with the assistance of a subcontract with the National Opinion Research Center.

At the inception of the DARP in June of 1969, the expansion of treatment facilities for opiate addicts was already accelerating, with the prospect (that subsequently materialized) of extremely large-scale investment in methadone maintenance as a therapy of choice, while at the same time very little objective information was available on the effectiveness of methadone, or for that matter, any other treatment approach for habitual users of opioid or other illicit drugs. With great wisdom, those who contributed to its design, and who authorized and protected its continuation, realized the importance of prospective, longitudinal tracking of persons entering treatment and rejected retrospective, quickie approaches to evaluation as misleading and often inaccurate.

The information required for research on the evaluation of treatment was viewed in 1968, when the DARP forms were created and pretested, as involving 1) patient descriptors, in order to investigate differential patient prognosis for different types of treatments, 2) baseline measures, to reflect status at the outset of treatment on factors to be measured as outcome criteria, 3) treatment delivery data, specifying the treatment paradigms as well as participation in significant components, and 4) outcome measures to serve as criteria. This general prescription is unchanged today, after 8 intensive years, although some of the items incorporated in the forms, might be improved on the basis of experience.

The Admission Report

Most of the information reported on both forms was obtained in interviews with the patients by trained interviewers assigned for this purpose. The reliability and validity of these data are discussed below. The Admission Report incorporates both patient background and baseline data. In the former category, it includes items on demographic characteristics (age, ethnicity, sex, socioeconomic level, education, and occupation), family background, criminal history, employment history, alcohol and drug use history. In addition, it provides information on drug use, alcohol use, employment, living arrangements, sources of support, and criminality during the 2 months preceding admission. This information as well as that reported on the Status Evaluation Form, below, is identified only by agency code numbers and elaborate provisions are implemented for protection of the confidentiality of the entire file.

The Admission Report was revised in the middle of the third year of its use. The revision clarified a number of item definitions, dropped some unproductive items, added a few new items, and tightened up the definition of an admission, which had some ambiguities in the previous version.

The Status Evaluation Report

This form was submitted at bimontnly intervals up to termination and reported treatment components participated in during each period as well as patient performance in respect to drug and alcohol use, living arrangements, employment, role activities, sources of support, and criminal activities. It was used also to indicate patient status at the close of each period (in treatment, deceased, terminated, or other statuses, such as hospitalized or jailed). It was revised and shortened at the same time as the Admission Report.

Although the Status Evaluation Report identifies treatment received and components attended by patients in each report period, it does not define the treatment paradigms involved. This would not have been feasible for two reasons. First, only the general treatment modalities, such as methadone maintenance or therapeutic community, but not the specific treatment paradigms within modalities, were known at the start of the DARP; the analysis of characteristics of the various treatment programs and determination of specific treatment types within each of the major modalities represented among the agencies reporting was accepted as a research problem and such types could only have been reported on the DARP forms if generally accepted labels had been available. Second, the characteristics of treatment programs represented data at a different level and were not appropriate for individual patient reports. As discussed later by Drs. Cole and James, such data were collected directly from the treatment programs by site visit.

Reporting Organizations

DARP reports were obtained from treatment agencies funded by the NIMH (and more recently, NIDA) under legislation related to the treatment and rehabilitation of opioid addicts and, later, other habitual drug abusers. In June, 1969, six agencies, providing treatment services for addicts, were the first to report. These were located in New Haven, Manhattan, Philadelphia, St. Louis, Chicago, and Albuquerque. Six additional agencies were included in the system by the end of the first year. At the end of the second year the number had increased to 23. In the third year it reached 36 and at the end of the fourth year, 51. One agency included in Year 3 was discontinued after a brief period. The reporting of new admissions was discontinued on March 31, 1973, when a new Federal reporting program, CODAP, was initiated,

but Status Evaluation Reports for patients then in treatment were continued for another year. The distribution of reporting agencies by year and region is shown in Table 1. It is apparent that the major locations of the reporting agencies were in New England, the Middle Atlantic States, and the Midwest, with the Pacific region fairly well represented only in the fourth year.

The Total DARP Population

As shown in Table 2, the total DARP file contains records on 43,943 admissions. The percentages of this total by year were 7% in Year 1, 18% in Year 2, 36% in Year 3, and 38% in Year 4. The regional distribution by year is roughly comparable to that which we have seen by agencies. Although this is a large file, the organizations designated to report were selected for a number of administrative reasons and it is not represented as a random epidemiological sample of drug users in the United States.

For the purposes of the evaluation research, 5510 admissions, representing 1) non-users of drugs reported by prevention programs at some of the agencies, and 2) persons who went through the admission process but did not enter treatment, were eliminated from the research file. Dr. Dwayne Simpson will present detailed information on the characteristics of the sample for Year 3 to which this symposium is addressed primarily. However, I will take a minute to review trends in the total research sample of the 38,433 drug users who entered into treatment, in respect to sample composition by age, sex, and race-ethnic status. These data are shown in Table 3, taken from a DARP study by Curtis, Simpson, and Joe (1974).

Over the 4 years during which new admissions were reported, the major trends in the DARP population were toward increased proportions of females, youth, particularly in the under-18 category, and Whites. There were

TABLE 1

Agencies Reporting to DARP by Region and Year of the Program

Region	Year 1	2	3	4
New England	2	3	5	8
Middle Atlantic	7	10	11	13
South Atlantic	0	1	2	5
East South Central	0	0	1	1
West South Central	0	2	2	3
East North Central	1	2	6	8
West North Central	1	2	2	2
Mountain	1	2	2	2
Pacific	0	0	4	8
Puerto Rico		1	1	1
Total	12	23	36	51

TABLE 2

DARP Population. New Admissions by Region and Year of the Program

Region	Year 1	2	3	4	Total
New England	300	1324	2028	1721	5573
Middle Atlantic	1293	4026	6271	4912	16502
South Atlantic	0	48	887	2050	2985
East South Central	0	0	403	425	828
West South Central	0	397	676	518	1591
East North Central	787	570	1208	2086	4651
West North Central	268	678	868	633	2447
Mountain	266	540	890	844	2540
Pacific	0	0	1535	3379	4914
Puerto Rico	0	686	1065	161	1912
Total	3114	8269	15831	16729	43943

TABLE 3

Sex, Age, and Race-Ethnic Status of Patients
by Year of Admission
(After Curtis, Simpson, & Joe, 1974)

	Percentage of Patients					
	Year 1	Year 2	Year 3	Year 4	Patients	% of Total
Sex						
Male	81	80	76	72	29007	75
Female	19	20	24	28	9426	25
No. of Patients	2673	7341	13987	14432	38433	
Age						
Under 18	6	8	8	15	4107	11
18-20	13	17	19	17	6679	17
21-22	13	16	17	16	6134	16
23-25	14	17	20	18	7112	18
26-30	18	18	17	16	6439	17
31-40	27	18	14	13	5838	15
Over 40	9	6	5	5	2124	6
No. of Patients	2673	7341	13987	14432	38433	
Race-Ethnic Status						
Black	54	50	44	40	17077	44
Puerto Rican	6	13	11	5	3445	9
Mexican-American	8	8	7	9	3046	8
White	30	28	36	44	14295	37
Other	2	1	2	2	570	2
No. of Patients	2673	7341	13987	14432	38433	

corresponding decreases in the proportions of males, older persons, particularly in the range between 31 and 40, and Blacks. An important implication of these changes, which reflect in part administrative response to legislation affecting treatment program support and admission policies, is a shift from services primarily for heroin and other opiate addicts, in the first 2 years, to the inclusion of increasing numbers of polydrug users in Years 3 and 4.

Data Organization -

Although data collection began in June, 1969, it required 2 years before a sufficient number of patients to construct a research sample had had an opportunity to spend a full year in treatment. During that period the major effort was devoted to development of the master computer file and the preparation of the data for analysis. The first research contract was authorized in June, 1971.

The evaluation research is organized by patient cohorts, consisting of samples admitted during a designated period of time and followed for a uniform period to allow all patients an equal opportunity to pass through treatment. The evaluation is conceptualized as involving two phases. The first is the period during treatment, while the patient is under the surveillance of the treatment program, and the second, posttreatment, after he returns to unsupervised community living. Funding of the DARP research to date has provided for three sets of during-treatment studies, of Cohort 1 (Years 1 and 2), Cohort 2 (Year 3), and Cohort 3 (Year 4), as well as the posttreatment sample followup studies of Cohorts 1 and 2, initiated August 1, 1974.

For the during-treatment evaluation studies the major analyses have necessarily focused on comparison of treatments within the four modalities represented in the DARP file: methadone maintenance, outpatient drug-free

treatments, therapeutic communities, and detoxification programs. Differences between these major groupings, particularly with respect to duration of treatment, made cross-modality comparisons difficult. In addition, except for measures of retention of patients, which were studied separately, most of the behavioral measures built into the SER for criterion purposes were suitable primarily for outpatient programs, in which the patients would be at risk to use drugs, commit crimes, and participate in illegal activities, in the community. Their use was limited with respect to residential (therapeutic community) and inpatient (hospital) programs. Finally, the analyses related to short-term patients, who dropped out with only one SER, and that often incomplete for those who chose to be evasive, were necessarily limited in the during-treatment studies. As a result, the during-treatment evaluation results are restricted by the analytic opportunities provided in the situation. Most of these restrictions are inoperative in the posttreatment studies, however, where risk is not differentiated in relation to type of treatment and in which the short-term patients provide important comparison groups.

Research Design of During Treatment Studies

The significant questions to which the DARP research is addressed are finally concerned with assessment of outcomes of treatments differentially with respects to discrete components of the patient population. In order to accomplish the required assessment it is necessary to specify the treatments to be evaluated, the patient groupings that will serve as discrete components of the population, and the outcome variables and measures to represent them. With these elements specified, it is possible to consider a research design.

The DARP research staff, most of whom are participating in this symposium, were in the position of pioneers when these issues were first considered, for

there were virtually no satisfactory guidelines in the literature. However, with a strong background in multivariate methodology and supreme confidence supported mainly by resolute commitment to the task, they explored previously uncharted domains and created structures that permit systematic and sophisticated analysis of the data. Let me summarize these briefly.

Data Management. I have chosen to discuss the elaborate methods employed to insure reliability in relation to design because I firmly believe that data management is an important element of design even though it is rarely mentioned in courses on this topic. Keeping in mind that the DARP is a large-scale, field, data collection enterprise, it was not unexpected that the patient reports presented problems of missing data, logical inconsistencies, extreme values, and other types of error. All data received were screened by data editors who checked omissions and obvious errors before any data were recorded. From the editors the forms went through data processing where they were checked further by an elaborate set of editing programs that identified errors, inconsistencies, and extreme values and these were referred to the sources for explanation and correction. The IBR maintained a staff that worked closely with and visited the agencies continually. File maintenance procedures were followed that enabled insertion of revised data on a routine basis. There may still be an unverified male housewife or teenage father of five in the file, but the consistency of this file overall is remarkable.

In addition to the efforts to achieve completeness and consistency, most of the data entered into analyses were either standardized composites derived from cluster or factor analyses or scaled to index numbers that reflected desirable properties in statistical analyses in comparison with the raw measures. In many cases, scaling corrected for extreme values without doing

violence to the distributional properties of the variables. Comparisons of correlations based on raw data with those based on such transformations verified the superiority of the transformations. Examples of these operations will be seen in the substantive papers that follow.

Finally, there has been much concern with the validity of the DARP patient report data. Comparison with documentary sources is subject to error also. Such comparisons are often prohibited by law, as in the case of invasion of privacy. In the present study, since the data were reported anonymously, any efforts to verify would have involved an enormous task, even if sanctioned. The evidence supporting validity is of three types. First, comparisons of individual records have been reported with other research data on DARP patients (Maddux, 1973). These have shown close agreement on most items when collected independently, each without knowledge of the other. Such results on similar populations have been reported with sufficient frequency in the literature (Ball, 1967, Stephens, 1973, Cox and Longwell, 1974, and others) that they compel attention. Second, in numerous instances, complex analyses of DARP data have been replicated on samples from several cohorts, with highly similar correlation structures and other relationships that would not be expected by chance. And third, there have been a few opportunities to compare interview data with objective reports. One of these involves the comparison of drug use reports with reports of urine tests. Another has involved comparison of death reports on SER's with other sources, such as reports from NIMH. In both cases, the results, while not in perfect agreement, reflect levels of validity of acceptable magnitude and comparable with that accepted in most social science research.

Patient Classification. In the studies of Cohort 1, Dr. Douglas McRae (1973) developed a patient typology by cluster analysis of profiles of

Admission Report variables, including a set of patient background indices constructed by Dr. George Joe (1973a). This year, Dr. Joe in collaboration with Dr. Simpson, replicated the McRae study and verified the support for the typology on new and enlarged samples. However, they recommended use of a patient classification profile rather than type categories for reasons that will be outlined in Dr. Joe's paper.

Treatment Specification and Classification. This has been a major task in the DARP program. The first effort to identify discrete treatment paradigms was the 1973 study by Deena Watson in collaboration with Dr. Simpson and Dr. Douglas Spiegel. It involved the completion of detailed protocols describing treatment programs in the field and sorting of these with respect to salient aspects of goals, philosophy, organization, policies, methods, staffing, facilities. Further studies by Dr. Steven Cole and Mrs. Olive Watterson (1974) and Dr. Lawrence James and several associates (1974) will be reported in the paper by Dr. Cole and Dr. James. In addition to the taxonomic questions of identification of treatment paradigms these studies have also addressed the problems of classification of programs and classification of patients by treatment types.

Criterion Measures. While it is an axiom in evaluation research that criterion design should reflect program goals, the DARP program reflects a network of treatment programs, with differing goals in many cases, and at the same time required uniform measures for all programs. As a result, program goals are incorporated in treatment paradigm definitions and system goals were adopted representing the Federal (and generally the public) expectations concerning rehabilitation of drug abusers. These involve mainly treatment outcomes reflecting changes in patient behavior in the direction of conformity to standards of citizenship, such as discontinuance of use of illicit drugs,

work and self-support on legitimate jobs, elimination of criminal activities, and assumption of appropriate role responsibilities. Dr. Robert Demaree has carried out extensive research on the development of criterion measures that meet rigorous standards of statistical acceptability (Demaree, 1973, Demaree and Neman, 1974) and he will report on this later this morning.

Evaluation Studies. During-treatment evaluation of DARP cohorts has been divided into three phases. These include studies of patient retention, patient deaths while in treatment, and of patient outcomes on criterion measures. In the retention studies, time in treatment is a dependent measure, while in the outcome studies it is a covariate. Dr. Joe will summarize the results of the retention study of Cohort 2 (Joe and Simpson, 1974) and Dr. Richard Gorsuch will present the results of an outcome evaluation study of Cohort 2 (Gorsuch, Abbamonte, and Sells, 1974). Mrs. Watterson presented a summary of three DARP studies of addict deaths at an earlier meeting at this convention; I will incorporate some of those results in my summary at the conclusion of this program. At that time I will also compare the Cohort 2 studies with those of Cohort 1, in particular the results on retention (Joe, 1973b) and on outcome evaluation (Spiegel and Sells, 1973).

The present research involves a large-scale, quasi-experimental, field investigation in which the distribution of subjects across treatments was not under the control of the investigators. In fact, the assignment was not only not random, but in many cases systematically biased as a result of medical, professional, or administrative policies. Assignment in some cases involved no choice, as when a treatment program was both the only one available and offered only one type of treatment. Varying acceptance rules, involving residence and other factors, were practiced at all agencies and assignment rules, where choices were available also varied among agencies.

Assignment to methadone programs was also restricted by Federal guidelines, which set a minimum age limit and admission criteria involving length of addiction and previous treatment. As a result there is no balanced distribution, but rather an imbalance that posed challenging problems in analysis. In general, younger patients, who were also more frequently nonopioid users, were assigned to drug-free programs, while a disproportionate number of older patients were assigned to methadone programs. There were also linkages of ethnic groups to particular treatments; for example most of the Mexican-American methadone patients were in one treatment type, while most Puerto Rican methadone patients were in another. Finally, it was not feasible, within the limits of the DARP, to obtain control groups. Indeed, with most patients in treatment under some form of coercion, it would have been impossible to obtain comparable samples not in treatment on whom reports could have been obtained.

The during-treatment studies undertaken thus far have tracked patients only during the first full year following admission. This was partly a matter of administrative convenience in relation to contract schedules but, at least initially, also reflected the belief that within one year most of the patients would have terminated. This belief has proven to be true for drug-free and detoxification treatments and to a large degree for therapeutic communities, but not for methadone maintenance, as we will see shortly. I mention it because a colleague at one of the reporting agencies recently suggested that results observed during the first year in treatment may not be representative of later behavior in treatment. This is a hypothesis that has not been tested in the DARP program, although the design of the new followup studies may be responsive to it in part. If this hypothesis should be supported it might have a bearing on the structure of methadone maintenance

programs that the present research does not address.

These, then, are the data and some of the limitations of the DARP program. To those accustomed to the refinements of design under laboratory conditions, it presents some difficult and perhaps distressing problems. On the other hand it also presents an opportunity to investigate, under realistic, operational conditions, issues of the most serious concern in contemporary society. Despite the limitations noted, the DARP population does represent: 1) a majo segment of the treatment effort supported by the Federal government, 2) almost the entire spectrum of treatment approaches practiced in the late 1960's and early 1970's (certain religious programs, acupuncture, and experimental new pharmacological agents are not included), 3) substantial samples from about 50 major metropolitan areas of the United States of the principal ethnic groups involved in addiction, and 4) probably the most comprehensive, most reliable, and most valid set of data on a drug using population that is available today. When the followup data are incorporated, from the grant study that is just beginning, its value will be further enhanced.

Research on Patient Characteristics

D. Dwayne Simpson

Although the DARP patient population is not a randomly-drawn epidemiological sample of American drug users, it does represent a large segment of patients who entered community-centered programs for drug abuse treatment, and it offers one of the most complete sources of information currently available for assessing demographic and background characteristics of contemporary drug users. Several of the most prominent attributes of the 1971-1972 DARP patient sample will therefore be summarized in order to provide a picture of the drug users on which the research to be reported this morning was based.

Between June 1971 and June 1972, the DARP (Slide 1) included 36 treatment agencies; 16 were in the Northeast United States, 5 were in the South, 10 in the Midwest, 4 in the West, and 1 in Puerto Rico. The final research sample of the 1971-1972 DARP cohort included 12,297 patients from 31 agencies. The major types of treatment included methadone maintenance (41% of the patients), therapeutic communities (16%), other drug-free therapy (17%), detoxification (23%), and other less frequent or mixed treatment approaches (3%).

Distributions of the sex, ethnicity, and age (Slide 2) of the patients indicate that three-fourths (76%) were male, and with regard to ethnic group, almost half (46%) of the

patients were Black and about one-third (36%) were White. Puerto Ricans and Mexican-Americans represented 10% and 7% of the sample, respectively, while Others (such as Oriental) accounted for the remaining 1%. Age of the patients was generally in the 18-30 year range with 17% to 20% in each of the age groups 18-20, 21-22, 23-25, and 26-30. Approximately 8% were under 18, 14% were 31-40, and 5% were over 40.

The age distributions within each of the ethnic groups (Slide 3) were generally comparable, with the age range 21-25 predominant. An exception to this, however, involved Mexican-Americans. In this case, the percentage of patients tended to increase in the older age groups (particularly among males); 40% of these patients were over 30 at the time of admission to treatment. On the other hand, Whites included the smallest percentages of patients in the 26-30 and over 30 age groups, and tended to include more younger patients (particularly under 18) than other ethnic groups.

Drug use during the 2 months pretreatment (Slide 4) primarily involved heroin; just under 70% of the patients used daily, and almost 10% used heroin on a less-than-daily basis. Thus, only about 20% of the patients reported no use of heroin in the 2 months before treatment. The use of other drugs was much less prevalent than for heroin; marihuana was used by about 50% of the patients (12% daily), barbiturates and cocaine each about 30% (3%-5% daily), and other opioids,

amphetamines, hallucinogens, and other drugs (such as glue and other inhalants) each by about 15% or less.

Several different patterns of multiple drug use were determined (Slide 5), and most of them involved heroin daily. The most frequent, pattern H, reflected daily heroin with no other drugs (except marihuana in a few cases) and accounted for one-third of the sample. Other patterns included daily heroin with some use of cocaine (pattern HC), 15%, with barbiturates (pattern HB), 7%, or with any one or two other nonopioids (H+), 3%. Pretreatment use of three or more nonopioids, with daily heroin (pattern H+Poly), was reported by 11%, and without daily heroin (pattern Poly), by 6%. Another 14% reported using only one or two nonopioids, but no opioids daily. The remaining patients were not classified due to pretreatment confinements (such as in jail or hospital) or having been transferred from other (non-DARP) treatment programs.

Within ethnic groups (Slide 6), prevalence rates associated with the drug use patterns were generally comparable between Blacks, Puerto Ricans, and Mexican-Americans; the principle exception involved the extremely low prevalence rate for HC (near zero) among Mexican-Americans, and the correspondingly high rate of H (58%). Among Whites, the predominant use of nonopioids without daily heroin (patterns Poly and LDO+) was comparatively high in prevalence. With regard to

age (Slide 7), patterns Poly and LDO+ were most prevalent among younger patients (particularly under 18), while the daily heroin patterns H and HC became increasingly prevalent with increasing age. (These general age-related trends were also consistent within each ethnic group.)

The first illegal drug used (Slide 8) was marihuana for 57% of the patients, and heroin for 21%. Each of the remaining drugs was substantially less prevalent (generally 5% or less). Sex-related differences were minimal, but ethnic and age groups were associated with notable differences, primarily with respect to heroin. Blacks included the highest percentage of patients who used heroin as their first illegal drug (31%), and Whites the lowest (8%). Marihuana as the first drug was most prevalent among Puerto Ricans (68%) and Mexican-Americans (64%), compared to 56% and 55% for Whites and Blacks, respectively. (Also notable but not shown in the slide is that 12% of the Mexican-Americans and 9% of the Whites used barbiturates first, and another 11% of the Whites used amphetamines first.) In terms of age, initial use of heroin tended to be more prevalent among older patients (26-30 and over 30).

The age at first use of an illegal drug (Slide 9) was between 14 and 20 for almost three-fourths of the patients, and was less than 14 for another 12%. The age of first opioid use daily tended to occur at an older age, of course, especially between 16 and 25; 20% began at 16-17, 30% at 18-20,

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and 20% at 21-25. Approximately 11% began opioids daily before age 16, 8% after 25, and 11% of the sample never used opioids daily. For patients who had used opioids, the modal year of first use (Slide 10) was 1969, about 2 years prior to admission to treatment; the percentages increased from 4% in 1964 to 14% in 1969, and then declined to 11% in 1970 and 8% in 1971. (The tendency for the first use of opioids to occur about 2 years before entry into treatment was consistent in all 4 years of the DARP admissions.)

Reports were also received on average daily consumption of beer, wine, and liquor by patients during the 2 months before admissions (Slide 11). It was found that a high proportion of patients were nonusers or only drank very small amounts. An average daily consumption of zero was reported by 74% of the patients for cans of beer, by 84% for pints of wine, and by 87% for drinks of liquor.

(Slide 12). Only 3% of the patients reported less than a seventh grade education, and 66% attended 10 to 12 years of schooling (10% reported education beyond high school). The major source of financial support during the 2 months before admission was a legitimate job for 23%, public assistance for 14%, illegal activities for 31%, and family, spouse, or other for the remaining 32% of the patients.

(Slide 13). With respect to legal status at the time

of admission, it was indicated that over 40% of the patients were on probation or parole, or were awaiting trial proceedings. Also, prior to entering treatment, over 60% of the patients had spent at least 1 month in jail, and for almost one-third of these the time in jail was over 3 years. One-half of the patients reported no previous experience with treatments for drug abuse, but one-fourth reported two or more.

In summary, the 1971-1972 DARP patient sample (1) was predominantly male (76%) with most of the sample in the age range of 18 to 30, (2) the highest proportions identified by ethnicity were Black and White, (3) they were predominantly daily opiate users (68%), and started using drugs while quite young, (4) most were nonusers of alcohol, at least during the period immediately prior to treatment, and (5) the majority completed 10 to 12 years of education, but almost one-third reported that their major source of support was illegal and almost two-thirds had spent time in jail.

DEFINITIONS OF GROUPED PATTERNS OF DRUG USE

Drug Use Patterns	Frequency of Use[a]							
	Heroin	Other Opioids[b]	Barbiturates	Cocaine	Amphetamines	Hallucinogens	Marihuana	Other
1. H	1	-[c]	4	4	4	4	-	4
2. HC	1	-	4	1,2,3	4	4	-	4
3. HB	1	-	1,2,3	(any 4 or more must = 4 .....)				
4. H+	1	-	(any 4 or more must = 4 .....)					
5. H+Poly	1	-	(any 3 or more must = 1,2, or 3 .....)					
6. Poly	2,3,4	2,3,4	(any 3 or more must = 1,2, or 3 .....)					
7. LDO+	2,3,4	2,3,4	(any 4 or more must = 4 .....)					

[a]Usage code: 1 - Daily; 2 - Weekly; 3 - Less than weekly; and 4 - Not at all.

[b]Includes illegal methadone.

[c]Dash (-) implies there was no restriction in the frequency of use for defining a pattern.

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S-1

DRUG ABUSE REPORTING PROGRAM
1971-1972 RESEARCH SAMPLE

NUMBER OF TREATMENT AGENCIES	36
LOCATION OF TREATMENT AGENCIES:	
NORTHEASTERN UNITED STATES	16
SOUTHERN UNITED STATES	5
MIDWESTERN UNITED STATES	10
WESTERN UNITED STATES	4
PUERTO RICO	1
TOTAL NUMBER OF PATIENTS	12,297
TYPE OF TREATMENT RECEIVED:	
METHADONE MAINTENANCE	4981 (41%)
THERAPEUTIC COMMUNITY	1955 (16%)
DRUG FREE THERAPY	2105 (17%)
DETOXIFICATION	2885 (23%)
OTHER	371 (3%)

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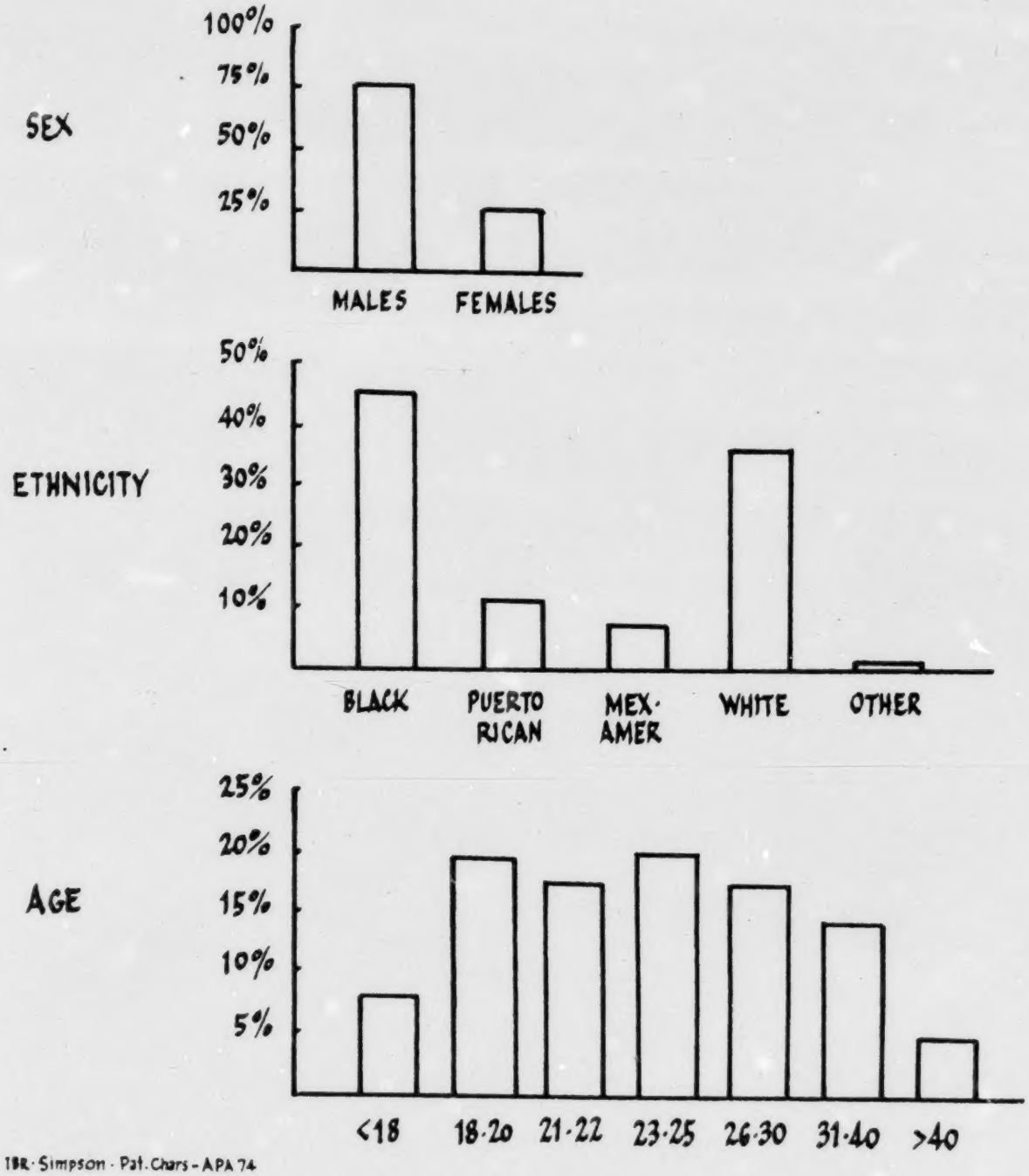
5·2

SEX, ETHNICITY, AND AGE



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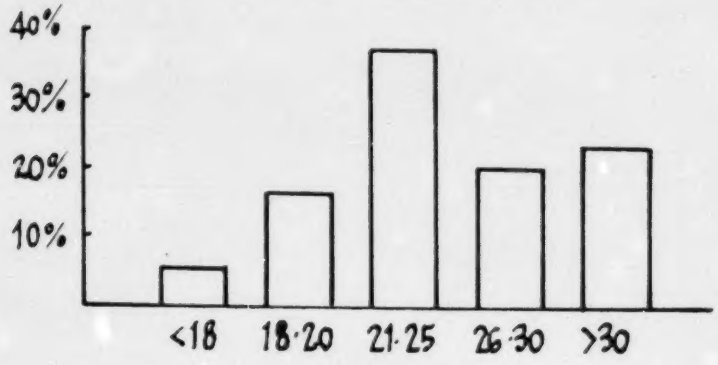
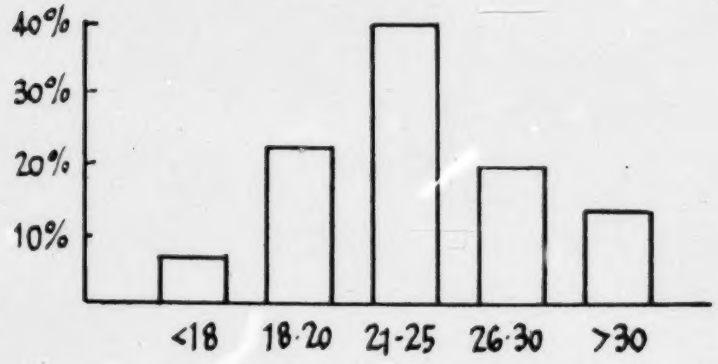
AGE DISTRIBUTIONS BY ETHNIC GROUPS

5·3

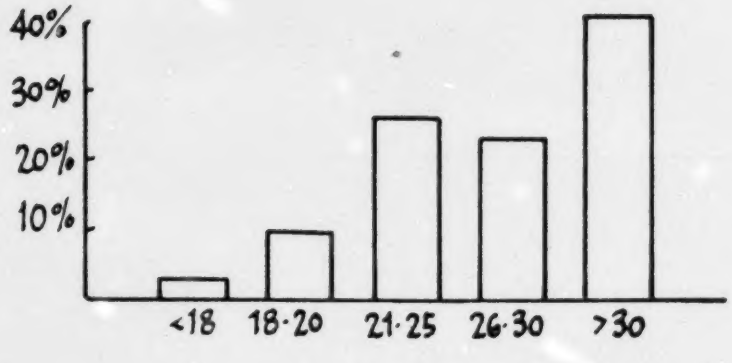
BLACK



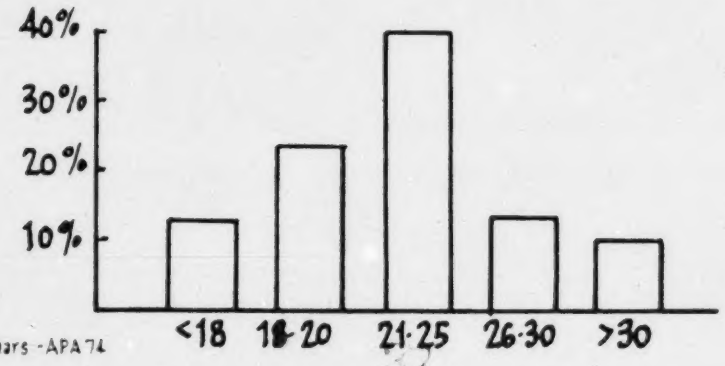
PUERTO RICAN



MEXICAN-AMERICAN



WHITE



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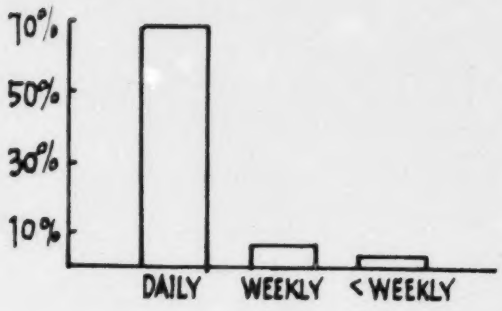
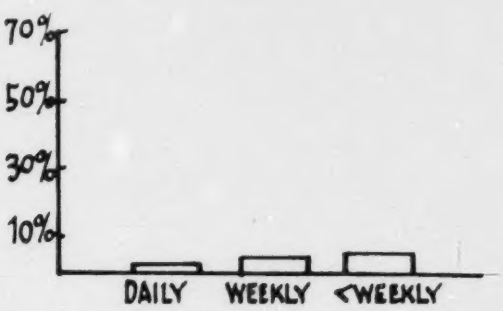
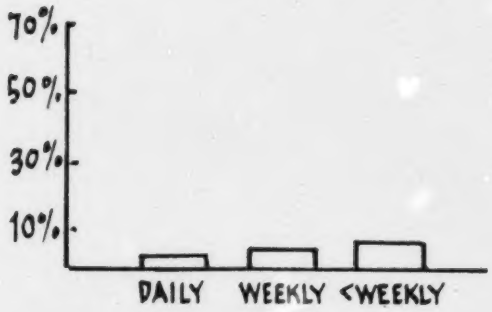
DRUG USE DURING THE 2 MONTHS PRETREATMENT



HEROIN

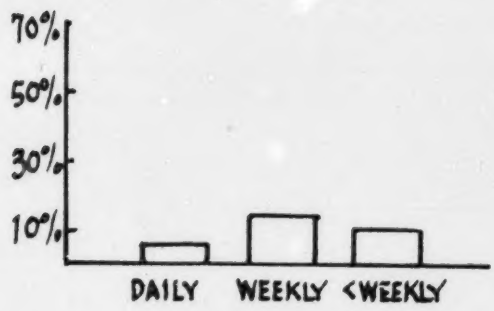


AMPHETAMINES

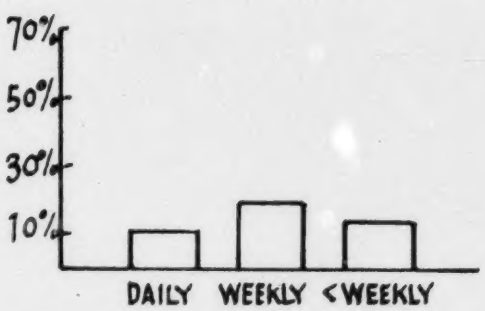


OTHER OPIOIDS

HALLUCINOGENS



BARBITURATES



MARIHUANA

COCAINE

OTHER

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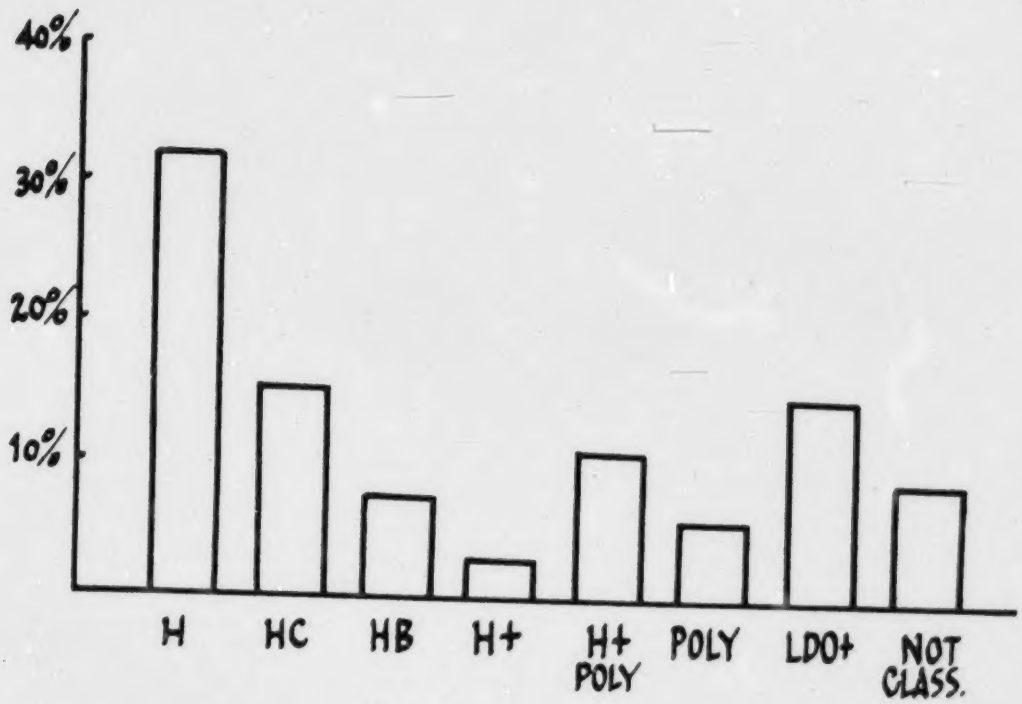
S-5

PRETREATMENT DRUG USE PATTERNS



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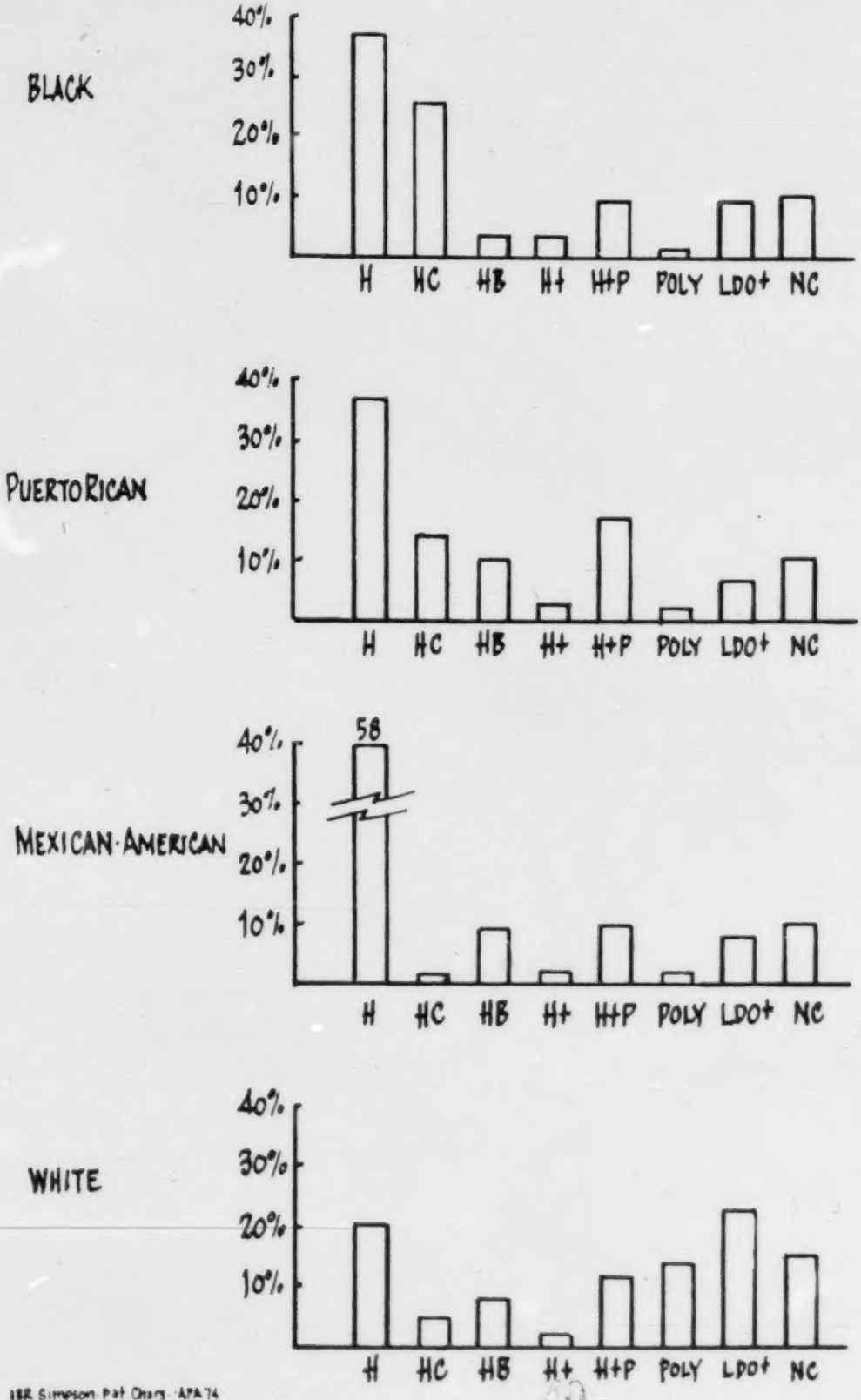
DISTRIBUTIONS OF DRUG USE PATTERNS BY ETHNIC GROUPS



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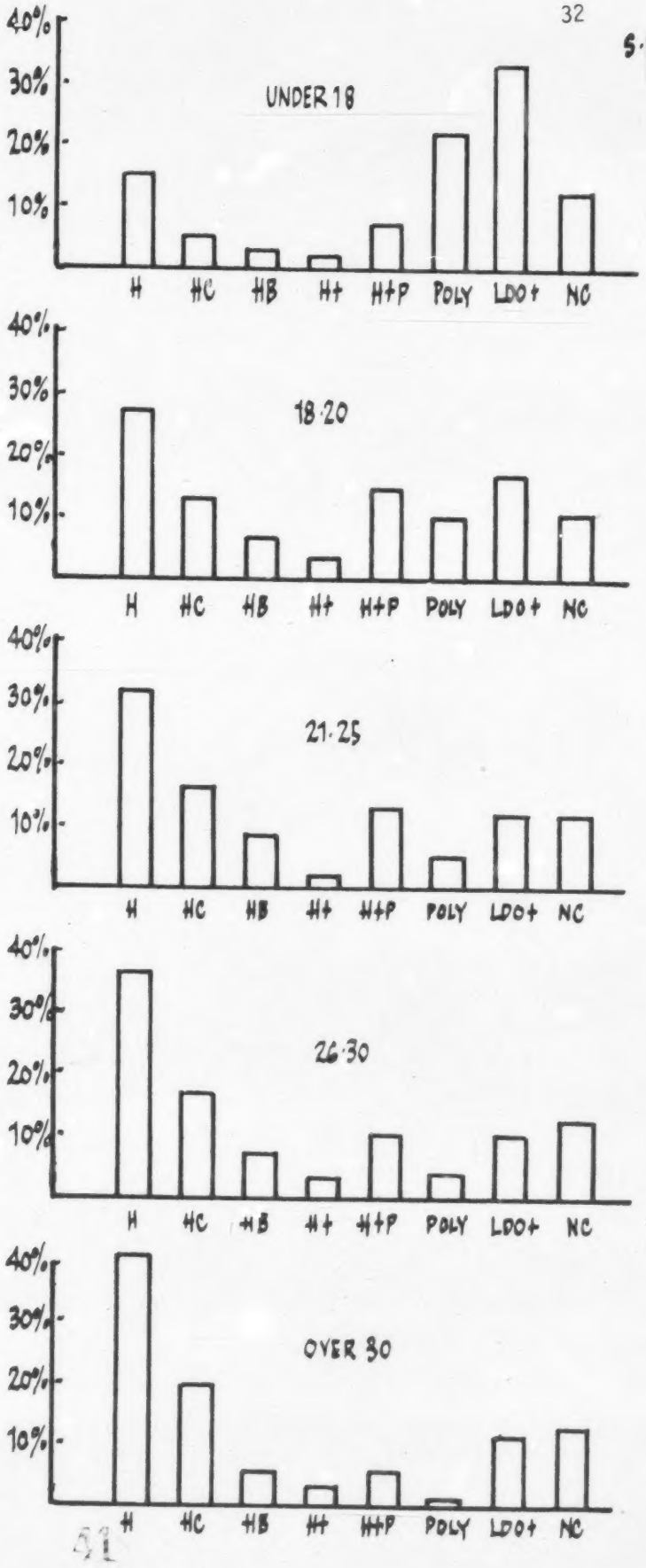
DISTRIBUTIONS OF DRUG USE PATTERNS BY AGE GROUPS



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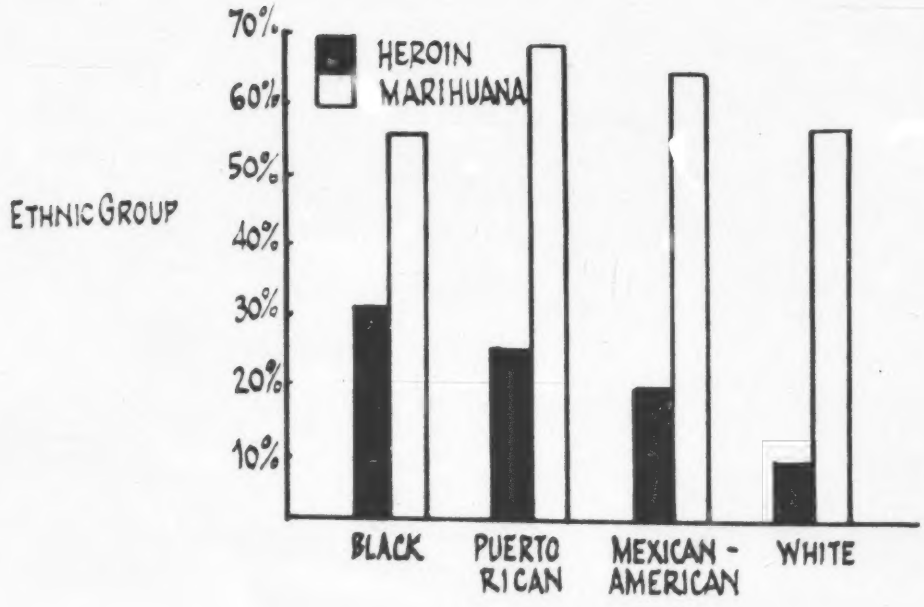
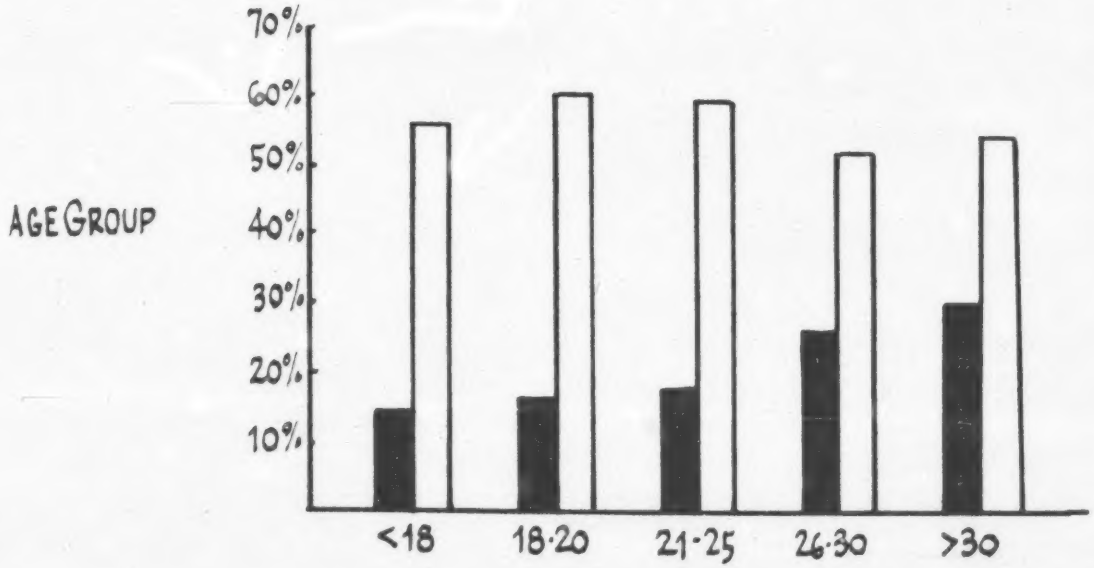
FREQUENCY OF HEROIN AND MARIHUANA AS THE FIRST ILLEGAL DRUG USED





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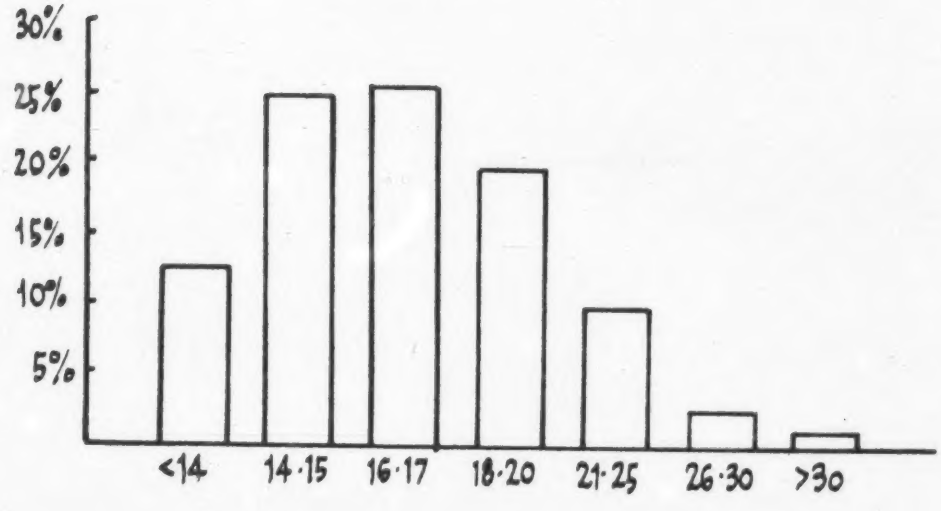
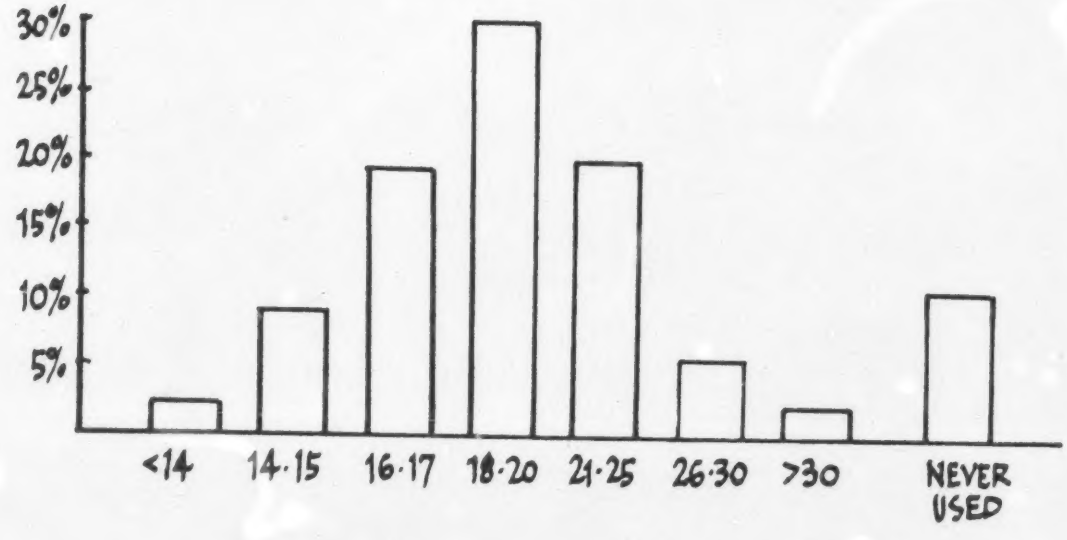
AGE FIRST USED AN ILLEGAL DRUG



AGE FIRST USED OPIOIDS DAILY



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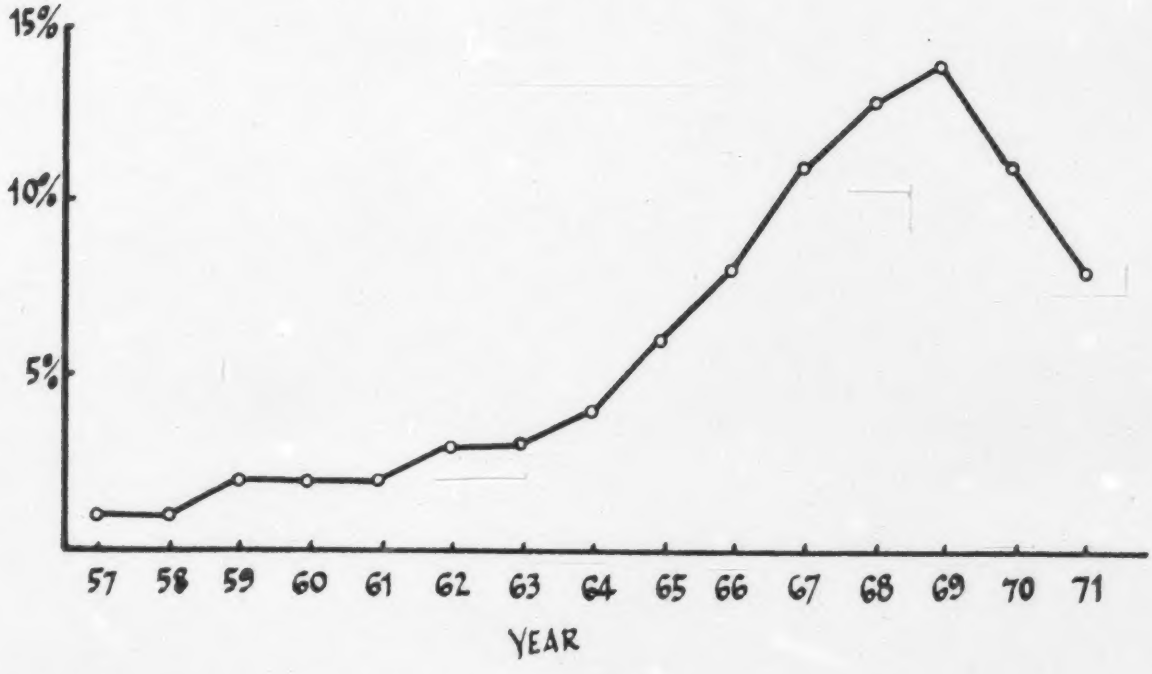
YEAR OF FIRST OPIOID USE



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5-11

PRETREATMENT
ALCOHOL USE

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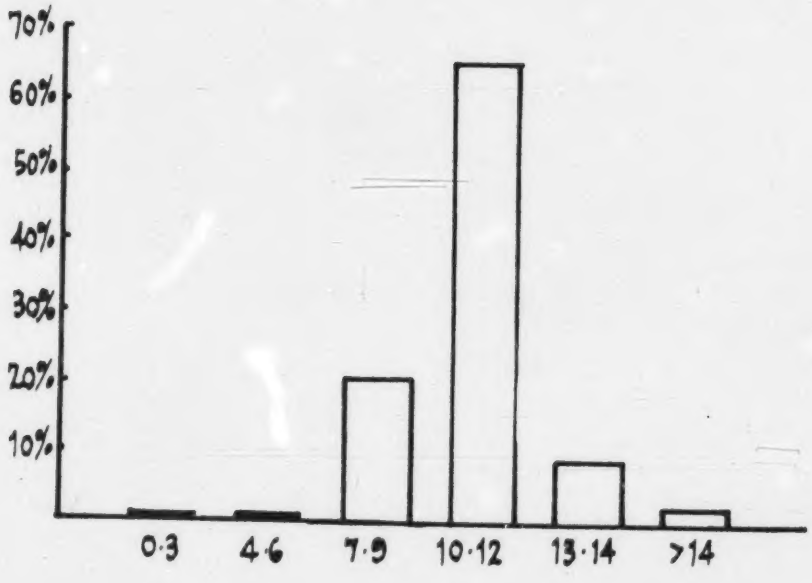
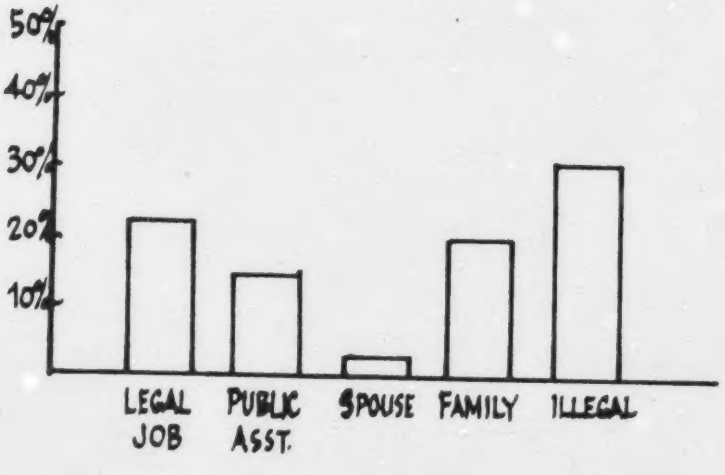
S12

HIGHEST SCHOOL GRADE COMPLETED



MAJOR SOURCE OF SUPPORT (2 MONTHS PRETREATMENT)



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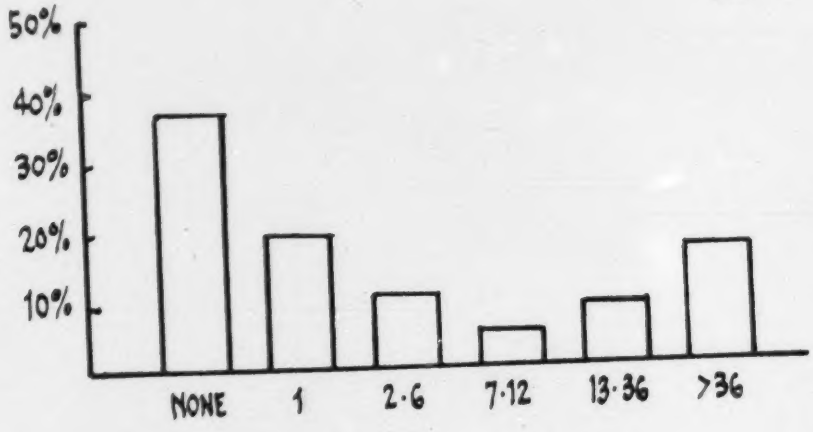
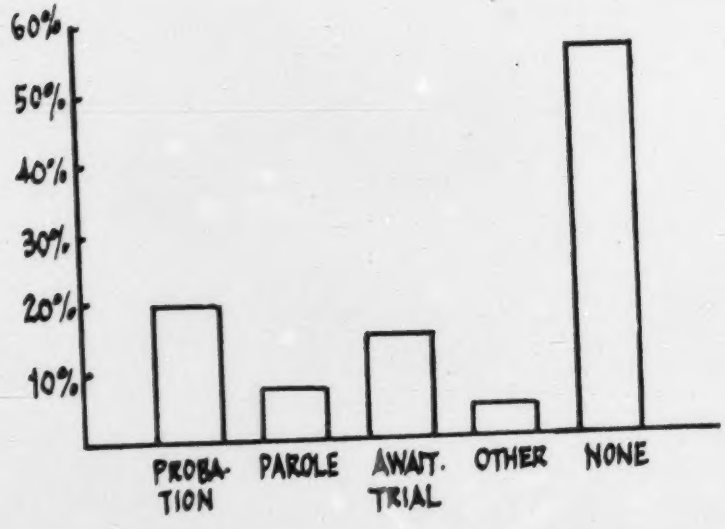
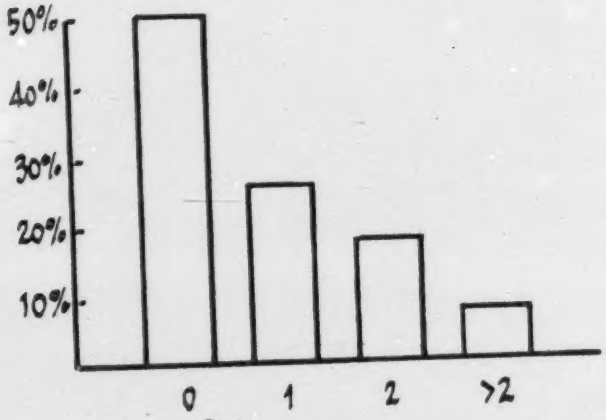
TOTAL MONTHS SPENT IN JAIL



LEGAL INOLVEMENT AT ADMISSION



NUMBER OF PREVIOUS TREATMENTS



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Research on Patient Classification

George W. Joe

and

D. Dwayne Simpson

In the DARP research program on evaluation of treatment effectiveness, a major effort has been devoted to patient classification using Admission Report data relating to the pre-treatment background and status of patients. In two previous evaluation studies based on DARP Cohort 1 samples (Joe, 1974b; Spiegel & Sells, 1974), the concept of homogeneous grouping of patients proved to be informative and useful in predicting differential outcomes in treatment. However, there was an important question regarding the patient classification research on Cohort 2 which had to be answered. This dealt generally with whether or not the same strategy should be employed as on Cohort 1, but more specifically it was a question of whether the patient types developed for the earlier cohort were still fully applicable due to the addition of new agencies and revisions in admission policies in those agencies continuing in the program. The present paper addresses this question.

The first DARP effort to produce a patient typology was the study by McRae (1974), in which he identified a small number of relatively homogeneous groups of patients, based on his analyses of first and second year DARP admissions. The 12 patient types that he identified in cluster analyses of patients, based upon the similarity of their profiles to one another, were used in the evaluation studies of the Cohort 1 admissions. Upon inspection, these 12 patient types were found to be defined largely by race-ethnic group, age, pretreatment drug use pattern, and in some cases sex of the patient.

Data of the Study

The patient classification variables used by McRae included most of the information in the Admission Report, but several other variables which were believed to have additional relevance were added in the current research on Cohort 2. Table 1 includes a list of variables, and denotes those used by McRae and also the current study. In the current research, the patient profile was extended by the addition of alcohol consumption, military service, and the number of years from initial illegal drug use to daily opiate use. In addition, the set of nine patient background indices (Joe, 1974a) were adjusted for their correlations with age and sex. The decision to make this correction arose from McRae's finding that the influence of these background indices was confounded and overshadowed by age and sex of the patient.

Results

The current (Cohort 2) research involves three parts. The first consists of a replication study of McRae's groups for the total DARP population, and the second involves a study which was carried out using the same methodology as McRae's, but for an expanded profile of variables. In the third part, the relationships among the classification variables were examined in detail. A summary of the results and some implications of these studies were as follows.

Replication of McRae's Classification

Clustering of patient profiles on a 4-year sample of the total DARP file, using the same variables as used by McRae, yielded essentially the same results as obtained by McRae. The variables which were most dominant in determining the clusters were race-ethnic group, age, illegal drug usage, and in some cases, sex. The 12 groups identified were (1) Older Black male heroin addict, (2) Young Black male heroin preaddict, (3) Young Black polydrug user, (4) Black female heroin and polydrug user, (5) Older Puerto Rican male heroin addict, (6) Young Puerto Rican heroin user, (7) Young Puerto Rican polydrug user, (8) Older Mexican-American male heroin addict, (9) Young Mexican-American heroin and polydrug user, (10) White opiate addict, (11) Older White opiate and polydrug user, and (12) Young White polydrug user.

Clustering of Patient Profiles Based Upon an Expanded Set of Variables

In this phase, the same cluster analysis was repeated including some variables which had not been included by McRae, but which were believed to merit consideration in the classification of Cohort 2 patients. As mentioned earlier, these variables included military service, alcohol usage, and years from initial drug use to daily opiate use. In addition, the adjusted patient background indices were used, corrected for correlations with age and sex. The 23 variables in this patient profile are the same as those listed in Table 1.

As in McRae's study, the final clustering of patients was done separately within each race-ethnic sample. The results generally indicated that the variables having most influence on the separation of patients into groups were pretreatment drug use, alcohol usage, military service, early drug involvement and criminality, and age.

Relationships Among the Classification Variables

The relationships among the 23 patient classification variables were examined by inspection of the intercorrelations and the joint frequency distributions, and through principal components analyses.

Correlations among the variables. The intercorrelations of the 23 variables were computed within each race-ethnic group, and the pattern of correlations was very similar across the four groups (Blacks, Puerto Ricans, Mexican-Americans, and Whites). Generally, the absolute magnitude of the correlations tended to be relatively low. The highest correlation for each ethnic group ranged between .54 and .62 and involved background Index 2 (Age at Involvement in the Drug Culture) and Index 3 (Criminal History). Among the remaining background indices, the correlations were much lower, often near zero. Other clusters of correlations of notable magnitude (generally .15 to .40 in absolute value) were among the three alcohol items (beer, wine, and liquor consumption), among the illicit drug usage variables, and between military service and age and sex. In general, however, the majority of the remaining correlations ranged between ±.10. Inspection of the joint frequency distributions of these

variables indicated that generally these low-level correlations were indeed indications of independence and not the result of curvilinear relationships.

Principal components analysis. A principal components analysis for each ethnic group was computed on the intercorrelations among the 23 variables. The sets of eigenvalues in all four analyses were approximately the same; that is, the proportion of variance accounted for by each principal component was comparable across race-ethnic groups. The first four rotated components in each analysis indicated the same interpretation. The set of 23 variables was, therefore, transformed to a reduced set of new variables (principal components) which not only had very similar variance but also the same structure across race-ethnic groups. These four dimensions for describing patients in each analysis were basically dimensions defined by combinations of variables in the following subdomains and directly reflect the intercorrelations of the variables selected:

1. Use of illegal drugs.
2. Consumption of alcoholic beverages.
3. Patient background indices (represented particularly by Age at Involvement in the Drug Culture and Criminal History).
4. Length of military service, age, sex, and years between first illegal drug use and first opiate use.

The implication of these results for the grouping of patients would be a completely-crossed classification based upon these four factors of patient background: alcohol use, drug use, early drug and criminal involvement, and age-military service.

Discussion

It can be seen that the variables of most influence in the cluster analyses were also the variables which were most important in the principal components analyses. The results of the cluster analysis essentially identified particular groups of patients formed by the cross-classification of the factors identified in the principal components analysis. One implication of these findings for the design of the Cohort 2 evaluation research is that if only a relatively small number of patient categories can be used and if every patient must be assigned to one of the categories adopted, then a substantial proportion of the patients would be placed in categories that would not be completely appropriate. Thus, based on the current set of descriptive variables, the definition of an analytically manageable number of homogeneous patient categories was not considered possible.

Because of this and problems with the interpretation of differential outcomes for groups which are associated with the complex multivariate definition of group composition, the strategy eventually adopted for patient classification in the Cohort 2 evaluation research was to abandon the typology approach in favor of a simple profile of classification variables. The variables included in the profile were (1) race-ethnic group, (2) sex, (3) age, (4) pretreatment illegal drug use, (5) pretreatment illegal alcohol use, (6) patient background indices, (7) military service, and (8) previous treatment for drug abuse. This

profile of classification variables was used in the outcome evaluation studies of Cohort 2. Although the attributes of simplicity and convenience associated with patient types were sacrificed in this strategy, greater opportunities were realized for more extensive analysis and finer interpretation of results with regard to the relationship between criterion measures and specific patient attributes.

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Table 1

Variables Used in Patient Classification Studies: McRae, Cohort 1 and the Current, Cohort 2 Study

	Variables	McRae Study Cohort 1	Current Study Cohort 2
1	Age	x	x
2	Sex (gender)	x	x
3	Heroin use (preadmission)	x	x
4	Other Opiate use (preadmission)	x	x
5	Barbiturate use (preadmission)	x	x
6	Cocaine use (preadmission)	x	x
7	Amphetamine use (preadmission)	x	x
8	Hallucinogen use (preadmission)	x	x
9	Marijuana use (preadmission)	x	x
10	Type of Drug at Involvement (Index 1)	x	x
11	Age at Involvement (Index 2)	x	x
12	Criminal History (Index 3)	x	x
13	Family Responsibility (Index 4)	x	x
14	Employment Record (Index 5)	x	x
15	Socioeconomic Status - Parents (Index 6)	x	x
16	Legal Involvement at Admission (Index 7)	x	x
17	Intactness of Childhood Family (Index 8)	x	x
18	Educational Level - Patient (Index 9)	x	x
19	Beer use	-	x
20	Wine use	-	x
21	Liquor use	-	x
22	Military Service	-	x
23	Years from initial drug to daily opiate use	-	x

Research on Treatment Taxonomy: Development of a Treatment Typology

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and

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The literature on treatment for drug abuse identifies four major modalities that differ in major dimensions, but offers little information or theory to guide differentiation of approach within the several modalities. The four modalities are generally referred to as methadone maintenance, outpatient drug-free, therapeutic community, and detoxification. Within these modalities, the design variations among most of the addiction treatment programs that have reported to the DARP appear to have been guided by a few salient principles and programs have been developed in individual situations according to the views of their founders on these dimensions, along with their interpretation of local requirements.

In contemplating the development of a treatment classification scheme and the task of placing programs in the appropriate categories, not only the major dimensions, but the variations on various themes had to be taken into account. The study presented here is the second effort by the IBR staff on this problem. An earlier study (Watson, Simpson, and Spiegel, 1973) established the methodology and developed a taxonomy of treatments for the programs at 23 agencies that participated in the DARP during the first two years of its operation. The present study is a modification and extension of the Watson et al. study on the 36 agencies included in the DARP during Year 3.

The principal data used in these studies have been summaries of structured interviews and observational inquiries completed by IBR staff members during a series of site visits to agencies reporting to the DARP. Some information descriptive of the goals, philosophy, rationale, organization, staff, and procedures of the

treatment programs was also available in the agency proposals submitted for Federal funding. However, the site visits were the principal source of treatment classification information and were planned to provide detailed data concerning all aspects of each program that the staff could think of as relevant at the time this phase of the research was undertaken. The site visits included interviews with program directors, research staff, treatment component heads, treatment staff, other key staff, inspection of treatment units, records, and observation of activities in progress. Their focus was on the philosophy of treatment offered by each treatment program as well as the sequence and intensity of each of the treatment procedures. The information from each agency was synthesized into a composite program description (site visit summary) that was organized to facilitate the classification procedure.

The development of the 1974 treatment taxonomy began with a review of the site visit summaries that had been completed on the 36 agencies that had reported to the DARP during Year 3. Each agency director was requested to review the summary of his program and to indicate needed corrections. In nine cases, the feedback indicated a need for revisits. In those cases, new site visits were made, and the resulting site visit summaries were sent out for agency review. In all cases, the final version of the site visit summary was approved by the agency.

At the same time that the site visit summaries were being reviewed by the agencies, the 1973 Treatment Typology was reexamined critically by the IBR staff and outside consultants. A portion of this effort involved a conference at which the 1973

Treatment Taxonomy was discussed and evaluated by a group of consultants that included treatment program directors and treatment specialists from the agencies reporting to the DARP, as well as key Federal personnel. As expected, there was considerable discussion on many issues, not always reflecting unanimity of opinion. The result was a number of constructive criticisms and suggestions for further development of the classification plan, many of which were influential in the 1974 Treatment Taxonomy.

As in the previous study, the classification effort was conducted separately for programs within each of the four major treatment modalities. The essential features of the treatment strategem of each of these modalities were summarized as follows:

1. Methadone Maintenance (MM)

   The substitution of prescribed methadone for illicit opioid drugs for periods of time exceeding 21 days.

2. Outpatient Drug-Free (DF)

   Outpatient treatment services that emphasize abstinence from both licit and illicit drugs.

3. Therapeutic Community (TC)

   A residential facility in which the therapy process involves highly structured and demanding social relationships and in which patients frequently function as therapeutic change agents.

4. Detoxification (DT)

   Short-term programs (1-26 weeks) that focus on withdrawal from illicit drugs and provide no subsequent therapeutic services.

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The research that led to the identification of discrete paradigms within each of these modalities is reported in a recently completed monograph (Cole and Watterson, 1974) and cannot be covered in the time available today. Basically it involved an iterative procedure of sorting of complete summaries by independent analysts, resolution of differences, abstracting of classification criteria from the summaries of the separate groups, preparation of checklists for quantitative scoring, independent scoring by checklists, and comparison of results between groups. The discussion presented here covers primarily the treatment paradigms developed by these procedures.

Methadone Maintenance

The first (and currently most widely used) modality is methadone maintenance. The site visit summaries showed quite clearly that there were commonalities among methadone maintenance treatment programs that allowed them to be grouped into two relatively homogeneous treatment types: (1) Methadone Maintenance-Change Oriented (MM-CO) and (2) Methadone Maintenance-Adaptive (MM-A). Generalizing from the site visit summaries, formal descriptions of the two treatment paradigms were derived which stand as type models for all methadone maintenance programs assigned to each. The two treatment types thus defined within the methadone maintenance modality are described as follows:

MM-CO. Within the methadone maintenance modality, the goals of the change oriented programs are to assist the patient to achieve eventual drug-free living as a result of treatment, to totally resocialize the addict so that he can return to unsupervised community living, and the development of instrumental social skills.

As a treatment strategy, the MM-CO type programs have restrictive admission criteria, typically prescribe methadone at as low a level as the patient can tolerate, emphasize scheduled therapeutic counseling, are typically located in large institutions, have rigid dispensary hours within a structured framework of therapeutic activities, and provide special services for patients in withdrawal or aftercare phases of the treatment program.

MM-A. The goals of the Methadone Maintenance-Adaptive programs are to provide continued counseling and support to patients, all of whom are expected to continue indefinitely on methadone, to develop a sense of trust in the program staff and people in general, and to develop vocational skills that will allow the addict to hold a job.

The treatment strategies of the MM-A programs typically include a fairly open admission policy, methadone doses that are considered blocking doses, counseling provided as dictated by the patients' needs, a treatment facility located near the addict's neighborhood, a minimum of structured therapeutic activities, and no provisions for withdrawal and aftercare.

Outpatient Drug-Free

The second major modality is termed Outpatient Drug-Free; however, the term drug-free as used here does not exclude medication completely. It does mean that patients are expected to abstain from the use of drugs not prescribed by the program physician and that no drugs classified as maintenance drugs are used.

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Analysis of the site visit summaries of the agencies that reported patients who received some type of drug-free treatment indicated that there were two distinct drug-free treatment types that corresponded in many aspects to the methadone maintenance treatment types. Therefore, they were designated Drug-Free-Change Oriented (DF-CO) and Drug-Free-Adaptive (DF-A).

DF-CO. Within the Drug-Free modality, the goal of the change oriented program is complete resocialization of the addict in order to enable him to live a drug-free life in the community.

The treatment strategy for the change oriented programs generally focuses on the young person who is not a hard core addict. The typical change oriented program is highly structured and has phases of treatment with clearly defined rules of behavior that are enforced by heavy sanctions. The addict is expected to spend virtually all of his waking hours in the structured therapeutic environment. Re-entry processes are usually built into the treatment.

DF-A. The goal of the Drug-Free-Adaptive treatment type is to reduce the addict's need for drugs as a means for coping with societal pressures. Expecting the addict to return to a totally drug-free life is not considered realistic.

The typical treatment strategy of the adaptive programs is to turn no applicant away unless medical problems demand referral elsewhere. Counseling is available as needed, and virtually no structure is injected into the therapeutic process. It is designed to meet the immediate needs of the addict and in many ways may be thought of as extended crisis care. The initiation and termination of the interaction between the addict and the

treatment staff are controlled by the addict and generally occur as a result of crisis situations in his life. No provisions for termination are provided because of the view that the addict will always need some supportive therapy.

Therapeutic Community

The third modality is the therapeutic community. The therapeutic community site visit summaries were reviewed to determine the characteristics that might differentiate distinct treatment types. All of the programs that were called therapeutic communities, but were not residential facilities, were classified as Outpatient Drug-Free. It was concluded that three types of therapeutic communities existed in the DARP Year 3 sample: (1) the Traditional Therapeutic Community (TC-T), (2) a Modified Therapeutic Community (TC-M), and (3) a Short-Term Therapeutic Community (TC-ST).

TC-T. The goals of the traditional therapeutic community are to achieve changes in the addict's value system and lifestyle, to develop self-control, and to return him to unsupervised community living as a self-sufficient, effectively functioning member of society.

The treatment strategy of the traditional therapeutic community is characterized by high structure, high demand, and a highly punitive orientation. The expected time in treatment is one to three years, and it usually includes re-entry programs in which an individual either works outside the TC, goes to school, or is employed as a counselor at the TC. Most of the traditional TC's require that the addict have a job or attend

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school and that he have a savings account prior to termination from treatment.

TC-M. The goals of the modified TC are to aid the addict in attaining a drug-free state and to develop practical skills and tools to enable the individual to sustain himself in society. Expectations of total resocialization are usually regarded as overambitious.

The treatment strategies of the Modified TC call for about six to nine months in treatment. The level of demand and the severity of sanctions is usually moderate; however, they may range from very high to very low. Emphasis is placed on change of attitudes, the ability to work and interact with others, and the development of the capacity to accept responsibility. Graduates are expected to be drug free and to be working or attending school.

TC-ST. The goals of the short term TC are to assist the addict in eliminating drug use, to re-establish family relationships, and to provide the addict with skills to enable him to survive in his environment without resorting to criminal activity.

The treatment strategy of the short term TC's requires tenure in treatment of three to six months. Sanctions for nonconforming behavior and criteria for earning privileges are moderate to high, the graduated phases of treatment are loosely defined, and the criteria for graduation are frequently left up to the addict. Very rarely do the short term TC's require that an addict hold a job or be attending school as a requirement for

graduation. However, they are characterized as offering re-entry stages and often are part of a larger treatment program in which the addict continues to participate following the TC stage of treatment.

Detoxification

The fourth major treatment modality is detoxification. The site visit summaries for the detoxification programs indicated conceptual difference between this modality and the other three. That is, in most instances, the detoxification treatment programs exist in conjunction with at least one other major modality. However, because for many addicts detoxification was the only treatment received, it was considered appropriate to view it as independent of other treatment modalities. Examination of the site visit summaries resulted in the specification of two categories of detoxification treatment programs: (1) Detoxification Inpatient (IPDT) and (2) Detoxification Outpatient (OPDT).

IPDT. The goals of the inpatient detoxification programs are minimal. However, it is expected that the addict will be able to accept reality and will possibly continue treatment in a drug-free modality after detoxification.

In many programs, inpatient detoxification is primarily used for individuals who are addicted to barbiturates. The treatment strategy of the inpatient detoxification programs is obviously one of high intervention. The typical tenure is from one to six weeks. During that time, patients receive both individual and group counseling as well as continuous medical observation. For the most part, inpatient detoxification totally restricts the patients and allows them little interaction with the outside world.

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OPDT. The goal of the outpatient detoxification programs is typically to support the addict while he is withdrawing from drugs and to convince the addict to rely on the treatment staff during his periods of withdrawal.

Most outpatient detoxification programs use methadone as a routine procedure in their treatment regimes when detoxification from opiates is required. The outpatient detoxification treatment programs exert the lowest level of intervention in the addict's life space of all treatment types. The addict spends only the time he chooses to spend at the treatment facility. For the most part, this treatment places minimum restrictions on the addict, while at the same time it helps him control the size of his habit. The staff expects the addict to recycle through the treatment program periodically and, as a result, see little necessity for aftercare.

Some of the analyses reported in this symposium have made use of a further breakdown of the detoxification categories as a function of use of methadone in the detoxification regime. In those cases, two additional detoxification categories will be used, (1) Detoxification Inpatient with Methadone (IPDT-M), and (2) Detoxification Outpatient with Methadone (OPDT-M). For the purpose of the present report these additional categories have been subsumed under their respective detoxification treatment labels, IPDT or OPDT, with no breakdown by methadone use.

Comparison with Typology Developed by Profile Analysis

In an effort to examine further the empirical basis of the treatment typology, a multivariate profile analysis procedure raw score factor analysis was applied to the treatment process

information (James, Hammond, Hartman, and Sells, 1974a and b). The methodological base of this analysis was different in that treatment units, rather than agency programs (which often include numerous units at different locations), served as the level of analysis. The variable domain was essentially the same as in the agency program level of analysis.

The results of the profile analysis on units were quite congruent with the agency program typology discussed above. Differences were observed, however, with respect to the number of types per modality. These differences can be explained both rationally and statistically. The typology of agency programs focused on a rational weighting of the most salient variables with the goal of developing a parsimonious and yet explanatory typology of programs. The empirical analysis on units employed statistical weights, and further, was more sensitive to nuances of differences among units. In general, however, a more global typology could be achieved by combining unit types within modalities. These more global types corresponded generally with the typology resulting from the agency program analysis. For example, unit types for methadone maintenance were: (a) Long Term Maintenance, (b) Long Term Maintenance with Psychosocial Intervention, (c) Intermediate Withdrawal with Psychosocial Intervention, and (d) Long Term Withdrawal with Psychosocial Intervention. A combination of the first two of these types corresponds closely to the program type MM-A, while a combination of the latter two types corresponds with the MM-CO program type. This procedure actually provides some empirical validation for the typology presented earlier; however, there is a strong suggestion that the typology

can be improved by further empirical analysis.

Assigning Agency Treatment Programs to Treatment Types

To facilitate the sorting of agency programs according to the treatment types adopted, the information used consisted of the site visit summaries and individual Status Evaluation Reports on a random sample of approximately 90 subjects from each agency. The sorting was performed in two separate steps as will be described.

The first step in the sorting process utilized the DARP Status Evaluation Reports for the sample of subjects from each agency. Every report for each patient represented in the sample was assigned to one of 12 provisional treatment categories according to the treatment reported on that Status Evaluation Report. Since the study of the DARP Year 3 Sample tracked each patient for a period of one year following admission and each individual's file contained one Status Evaluation Report for each two-month reporting period, it was possible for each individual in the sample to have as many as six Status Evaluation Reports, or as few as one.

Following the assignment of each report to a provisional treatment category, the profile of each patient's treatment experience was reviewed for each agency separately. The treatment reported in each report period was classified according to the provisional categories, and the resulting sequence of provisional treatments constituted working treatment profiles. Based on these treatment profiles, each agency was determined to provide one or more of the four basic treatment modalities: (1) Methadone Maintenance, (2) Therapeutic Community, (3) Outpatient Drug-Free, and (4) Detoxification.

Following the assignment of agency programs to one of four basic modalities, the site visit summary for each agency was examined to determine which of the treatment types within each of the modalities was appropriate. Because of the possibility of bias associated with the subjective nature of the sorting process, two judges worked independently and conferred after completing their sorts of agency programs within each modality. In instances in which the two raters did not initially agree, the reasons for disagreement were explored in detail, and in some cases additional information was obtained from the agency before a consensus was reached.

Although many of the agencies provided multiple treatment programs and operated multiple units within one or more of the treatment modalities at the chosen level of analysis, the units within each modality could generally be classified into the same subtypes. There were no agencies that offered more than one type of methadone maintenance treatment or more than one type of outpatient drug-free treatment.

Assigning Patients to Treatment Types

Once the treatment types within each agency were determined, steps were taken to classify all patients in each agency according to the types of treatments that they had received. First, each patient's individual Status Evaluation Reports were coded according to the provisional categories developed for program classification, as explained earlier. Individual treatment profiles, consisting of the sequential provisional codes for all Status Evaluation Reports for each patient, were printed out for review in preparation for the development of computer algorithms

for processing of the total Year 3 sample. To account for unusual treatment profiles, the system developed included an undefined category. After classification by the algorithms, the coding of every patient was studied to insure its correctness. Some reassignments were made from one treatment type to another, but the primary changes were from the undefined categories to one of the treatment categories and to a category called Other in which the treatment that appeared did not fit any of the formal treatment types. In some cases, the Other classification was used for treatments provided for special types of addicts (for example, pregnant addicts or addicts in jail), and in some it was used for clearly defined combinations of three or more of the treatment types. Most of the changes resulted from inspection of the treatment profiles and a determination that, because of the general nature of the algorithm, the original classification was inappropriate. In some cases, to obtain the information necessary to classify an "undefined" patient, telephone contact was made with agency record supervisors. Reclassification of patients to treatment types was in effect a combination of information on the Status Evaluation Reports as well as additional information, obtained from agency records when needed. This procedure for classification of patients to treatment types was carried out separately for the patients in each agency. Table 1 reports the number of patients assigned to each treatment type, by agency, as a function of treatment profiles provided by the Status Evaluation Reports.

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Table 1

Number of Patients Assigned to Treatment Classification by Status Evaluation Report Profiles

Agency Code #	MM-CO	MM-A	DF-CO	DF-A	TC-T	TC-M	TC-ST	IPDT	OPDT	OTHER	UNDE-FINED	TOTAL N
301	30		168		48		7		1	44	1	299
302	18		79			21		116		20		254
303		9		76			53	32	511	52	1	734
304		89	27					7	28	1		152
305	47		35			10		53	12			157
306		25		72	169			1	23	8		298
307				8	33			6				47
309		409							19	2		430
310		3		56			23	1	401	3		487
311				25		293						318
312	236									1		237
313	653		3		12				2	1		671
315			215		169				4	3		391
319		88	1*	188	457			175	283	47	1	1240
320		124		10		45						179
321		391		5			4	1	3	1		405
323		89		18		4*		3	14			128
324			231							2		233
325	71			38	20			17	12	3	1	162
329		81		11			50	18	40	41		241
330	61			249			73	101	64	29		577
331		147					17		109			273
332		409		25					82	7	2	525
337		275	150			51		49	64	10	8	607
338		168		96	10			2	12	13		301
339		162		86				4	16	11		279
340		117		10				114	44	12	1	296
342		283		6			34			1		324
343	101			87			191	3	30	18		430
352	896				37	98	1*	1	6	4		1042
355				130		25		387	14	23		579
Total	2113	2867	909	1196	955	547	453	1091	1794	357	15	12,297
Modality Total	4980		2105		1955			2885				

*Note: These are errors that were discovered after the assignments were completed. They were not corrected for the final research tape because time that would be lost in reanalyzing the data was considered far more important than the variance that could be attributed to six misclassifications out of 12,297 cases.

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Outcome Measurement: During-Treatment Criterion Scales

Robert G. Demaree

The information available for the 2-month period preceding admission and each 2-month period during treatment is indicated by the list of 26 criterion measures. As shown in Table 1, these measures cover employment, alcohol consumption, opiate use, nonopiate use, criminality indicators, and stability of life situations.

The above measures were the culmination of a process which began with the editing and checking of report entries for inadmissible, extreme, or highly unlikely values. With regard to a missing entry, the decision was made to first seek a replacement from the very next report on the patient. If that did not work, the immediately preceding report was used as a replacement source. If this failed, the entry was recorded as missing. Two things were discovered about these missing data. The first was that they were non-random in character. Secondly, the entries in individual status reports tended to be all present or missing entirely.

Termination reports accounted for the majority of the missing entries. This was true before any entries were replaced, as well as afterwards. Of course, when the only report received for a patient was a termination report, nothing could be done about the missing entries. Apart from these reports, 22% of the termination reports contained two or more missing entries. This was reduced to 15% following replacement. In the case of other status reports, 12% had missing entries originally. This was reduced to 5% following replacement.

TABLE 1

List of Criterion Measures

Employment
Productive Activities
Income

Total Alcohol Consumption
Beer Consumption
Wine Consumption
Liquor Consumption
Alcohol Problem

Opiate Use*
Heroin Use
Illegal Methadone Use
Other Opiate Use
Opiate-Free Days*

Nonopiate Use
Barbiturate Use
Cocaine Use
Amphetamine Use
Hallucinogen Use
Marihuana Use
Other Nonopiate Use
Drug-Free Days*

Criminality
Illegal Support
Jail
Arrests*

Stability of Life Situations

*Not available for the 2-month pretreatment period

The approach taken to the task of constructing criterion measures followed closely upon previous research. The greatest challenge was offered by the unsuitability of the original variables for the kinds of statistical analyses planned. An example is offered by the distribution shown in Table 2 of the number of days of use of heroin during the first 2 months in treatment by 3496 outpatients who remained in treatment for 6 months or longer.

The problem presented by this distribution is not that 74% of the scores have a value of 0, but that 7% of the scores are strung all the way from 9 to 60. In this distribution a score of 60 is over 7.5 standard deviations above the mean. In addition, it was found that such scores usually showed a marked drop-off in the next period. Among the 18 patients who were reported to have used heroin for 60 days during the first 2 months, only four stayed at 60 in the second 2-month period, while 11 dropped to 7 days or less, including 5 patients for whom 0 days of use were reported in the second period.

To tone down such changes and to provide a more even distribution, representing the degree of heroin abuse, a conversion was made from days of use to a 4-point scale of index values. This is shown in the key to the index values at the bottom of Table 3.

TABLE 2

Days of Heroin Use During the First 2 Months in Treatment by 3496 Outpatients Who Remained in Treatment for 6 Months or Longer

Days of Use	N	Days of Use	N
0	2565	31	3
1	187	32	0
2	159	33	0
3	110	34	1
4	76	35	3
5	55	36	0
6	31	37	1
7	21	38	5
8	33	39	0
9	4	40	14
10	52	41	0
11	0	42	1
12	11	43	0
13	1	44	5
14	12	45	6
15	28	46	2
16	2	47	1
17	3	48	1
18	1	49	0
19	2	50	1
20	22	51	0
21	5	52	0
22	1	53	0
23	0	54	1
24	3	55	0
25	13	56	0
26	0	57	0
27	0	58	2
28	0	59	0
29	0	60	18
30	25	Missing	9

TABLE 3

Heroin Use, by Time Period

Time Period	Percent of Patients by Index Value			
	1	2	3	4
Pretreatment	15	2	4	79
First 2 Months	74	10	9	7
Second 2 Months	78	10	7	5
Third 2 Months	82	8	5	5

Key to Index Values:

1 0 days used per 2-month period
2 1-2 days
3 3-8 days
4 >8 days

For the sample of 3496 outpatients, it can be seen for the intreatment periods that a fairly even distribution is provided of index values of 2, 3, and 4, representing light, moderate, and heavy abuse. Notice, however, the reversal of heroin abuse during the 2-month pretreatment period and the first period in treatment; 79% of the patients were reported to have used heroin daily during the pretreatment period. In sharp contrast, 74% were reported to have used no heroin during the first period in treatment. Also, please notice that over the 6 months in treatment there is a gain of 8% in the nonusers of heroin.

The conversion, seen here, of days of heroin use to index values was applied also to other drugs. Thus, for the pretreatment period and each 2-month period that the patient remained in treatment, an index value was assigned to represent degree of use of each drug. In the case of a patient who remained in treatment for at least a year, an index value for heroin use was available for each of the six periods.

To measure the heroin use by such a patient over time in treatment, one is likely to think of the mean index value. As shown in Table 4, for outpatients who remained in treatment at least 6 months and who were followed up to a year, the mean index value was highly descriptive of heroin use over the time in treatment for over 70% of the patients. These were patients whose index values had a pattern described as "steady." To be specific, the index values of these patients did not differ by more than one point over the periods in treatment. The next largest group consisted of the 17% whose index values showed

TABLE 4

Percent of Patients With Given Mean Levels and Patterns of Heroin Use Over Time in Treatment

	Pattern				
Mean Level	Steady	Increasing	Decreasing	Fluctuating	Total
Little or no use	65.9				65.9
Light	3.7	0.9	8.0	14.8	27.4
Moderate	0.6	0.8	1.9	2.5	5.8
Heavy	0.9				0.9
Total	71.1	1.7	9.9	17.3	100.0

no appreciable trend, but fluctuated from one period to another. Remaining were nearly 10% who showed a decrease in heroin use, and the less than 2% with an increase in use.

While the distribution of patients over the ten groups, representing differential outcomes over the time in treatment, if of considerable interest, much more was learned upon comparison of the outcome groups on patient characteristics, pretreatment variables, and selected intreatment measures. In a series of multiple discriminant studies with Neman, Long and Gant, strong correlates of differential outcomes were found for employment, alcohol use, drug use, and criminality indicators over the time in treatment.

One of the major criterion variables was Employment, based on the total number of days worked either part time or full time, per 2-month period. In the conversion to index values, as shown in Table 5, it can be seen that a value of 4 means 0 days worked. Also, please note that unemployment during given periods has been subdivided according to its applicability. During periods in which a patient was unemployed, but was reported to be a student, housewife, prisoner, or inpatient, Employment was considered to be inapplicable.

The importance of this distinction in relation to sex is rather striking in this sample of 3496 outpatients. For females the percent for whom employment was not applicable was about four times greater than for males. When employment was applicable, unemployment was 5% greater for females than for males. For both sexes, however, there is a decided drop in unemployment

TABLE 5

Employment, by Sex and Time Period

Sex/Time Period	Percent of Patients by Index Value				
	1	2	3	4 - applicable	4 - not applicable
Males (N=2675)					
Pretreatment	29	6	4	57	4
First 2 months	34	7	3	48	8
Second 2 months	39	6	3	44	8
Third 2 months	41	5	3	43	8
Females (N=821)					
Pretreatment	13	3	2	68	14
First 2 months	12	3	2	54	29
Second 2 months	14	4	2	49	31
Third 2 months	14	3	2	48	33

Key to Index Values:

1 >30 days worked per 2-month period
2 16-30 days worked
3 1-15 days worked
4 0 days worked

from the pretreatment period to the first 2 months in treatment, and both sexes show a further drop of 5% in unemployment by the end of 6 months in treatment. In the case of females, the drop in unemployment is accounted for almost entirely by the increase in the percent of females who were unavailable for employment.

With respect to index values of 1, males showed a 15% gain from pretreatment to intreatment, and a further gain of 5% from the first to the second intreatment period. No such gains were found for females.

In the computation of mean levels and patterns of employment, periods during which employment was not applicable were excluded. As shown in Table 6, 31.5% had little or no employment while 21.4% had a high level of employment in that they typically worked during more than half the days in each 2-month period. Nearly 20% showed gains in employment, compared to 7% who showed a decline.

Alcohol use was reported in terms of average daily consumption of cans of beer, pints of wine, and drinks of liquor, but was converted to total ounces of 80-proof equivalent. These scores, in turn, were converted to index values. As shown in Table 7, a value of 4 signified an average daily consumption of over 8 ounces.

As with employment, sex differences were quite apparent. About 12% more females than males were reported to be nondrinkers. Among females who drank, however, the amount consumed, as shown by comparison of the percent with index values of 2, 3, and 4, was distributed about the same as for males. Although the

TABLE 6

Percent of Patients With Given Mean Levels and Patterns of Employment Over Time in Treatment

	Pattern				
Mean Level	Steady	Increasing (Gain)	Decreasing (Drop)	Fluctuating	Total
High employment	21.4				21.4
Moderate	1.1	8.9	2.4	8.1	20.5
Low	0.2	10.3	4.4	11.7	26.6
Little or none	31.5				31.5
Total	54.2	19.2	6.8	19.8	100.0

TABLE 7

Average Daily Alcohol Consumption,
by Sex and Time Period

Time Period	Percent of Males (N=2675) by Index Value				Percent of Females (N=821) by Index Value			
	1	2	3	4	1	2	3	4
Pretreatment	64	14	8	14	74	9	8	9
First 2 Months	70	11	8	11	82	7	5	6
Second 2 Months	69	12	8	11	81	8	4	7
Third 2 Months	70	10	9	11	81	6	7	6

Key to Index Values:

1 0 ounces of 80-proof alcohol per day
2 >0 but ≤ 4 ounces
3 >4 but ≤ 8 ounces
4 >8 ounces

nondrinkers increased from the pretreatment to the first in-treatment period, no trend was shown thereafter.

Over the first year in treatment, as shown in Table 8, slightly more patients (8.6%) showed a decreasing use than an increasing use (4.4%). Over half of the patients were reported to have used little or no alcohol, compared to only 2.3% whose use throughout the first year was described as "heavy."

The criterion measure, labeled "Nonopiate Use," was based on the maximum number of days of use of any nonopiate. Among these drugs, the percent of patients reporting one or more days of use during given periods in treatment was 10 to 12% for marihuana, 8 to 9% for barbiturates, 4 to 5% for cocaine, 2.5% for amphetamines, and less than 1% for hallucinogens. As can be seen in Table 9, a marked drop occurred in the use of nonopiates upon entry into treatment, but thereafter no trends were apparent.

Among the 26 criterion measures, listed previously in Table 1, several remain to be mentioned. Productive Activities was a dichotomous variable, scored as a 1 during a period in which the patient was engaged in gainful employment or was reported to be a student or housewife, and scored as a 2, otherwise. Opiate Use was based on the summed days of use of heroin, illegal methadone, and other opiates, or the total number of positive urines, whichever was the greater.

Criminality was based on three indicators. The first was an illegal source of support; this was reported for 40% of the patients during the pretreatment period, but for only 6% during given 2-month periods in treatment. The second was one or more

TABLE 8

Percent of Patients With Given Mean Levels and Patterns of Alcohol Consumption Over Time in Treatment

	Patterns				
Mean Level	Steady	Increasing	Decreasing	Fluctuating	Total
Little or none	54.1				54.1
Light	5.7	2.6	6.4	17.1	31.8
Moderate	1.0	1.8	2.2	6.8	11.8
Heavy	2.3				2.3
Total	63.1	4.4	8.6	23.9	100.0

TABLE 9

Nonopiate Use, by Time Period

Time Period	Percent of Patients by Index Value			
	1	2	3	4
Pretreatment	38	20	26	16
First 2 Months	76	8	7	9
Second 2 Months	78	7	6	9
Third 2 Months	78	7	6	9

Key to Index Values:

1 0 days of any nonopiate use per 2-month period
2 1-2 days
3 3-8 days
4 >8 days

days in jail, which applied to between 2 and 4% of the outpatients during given periods. The third was one or more arrests, with a prevalence of about 2.5% per 2-month period in treatment. In a detailed study by Gary Long and me of criminality indicatord, there was no evidence that these indicators declined over the time in treatment, but strong evidence was obtained for ethnic, sex, and age differences in the prevalence of arrests and time in jail.

A new variable in the present research, Stability of Life Situations, was based on changes in living arrangements and employment. This variable led to some provocative findings in the study of differential outcomes over time in treatment. For example, among patients who were unemployed throughout the first year in treatment, opiate users appeared to have less stable living arrangements than did those who made little or no use of opiates during treatment.

The correlations among criterion measures within given periods of time were generally rather low in value, with the exception of the drug use variables. Opiate and Nonopiate Use were correlated about 0.40. Among the nonopiates, polyuse was also suggested by certain correlations. The correlations for the same variables over different periods were highest for Employment, reaching above 0.70 for adjacent periods, but for the alcohol and drug use measures these correlations dropped to the 0.30 to 0.40 range.

In summary, it is believed that the index values served quite well as criterion measures, considering the highly skewed

distributions of the original data. The index values could be readily interpreted without reference to any statistical distribution and they lent themselves to the study of levels and patterns of outcomes over time in treatment.

Research on Patient Retention in Treatment

George W. Joe

and

D. Dwayne Simpson

An important consideration in the evaluation of treatment for drug abuse is the extent to which treatment programs can retain their patients in treatment in relation to their planned goals. Although retention does not assure the attainment of desired outcomes, the converse is important. That is, if patients leave before receiving sufficient exposure to the therapeutic process, the likelihood of positive outcomes is thrown into question.

Retention of DARP patients in Cohort 2 (admitted in 1971 and 1972) by each of the 11 treatments was examined in terms of three criteria: (1) treatment disposition up to 1 year after admission, (2) the rate at which patients terminated during the first 12 months in each treatment, and (3) the length of time spent in each treatment. Nine treatment disposition categories were used in the present study: (1) still in treatment 1 year after admission, (2) completed treatment and released, (3) referral to another program, (4) implied termination due to no treatment for 4 consecutive months or more, (5) quitting treatment against agency advice, (6) expulsion by the agency, (7) termination due to prolonged hospitalization, (8) termination due to prolonged incarceration, and (9) deceased. The last six of these categories, representing terminations from treatment prior to completion, were grouped together for calculating overall rates of premature treatment terminations among Cohort 2 patients.

Treatment Disposition and Tenure by Treatment Type

The percentage of patients in these categories of termination for each of the 11 types of treatments defined by Cole and Watterson (1974) for Cohort 2 were as follows: Methadone Maintenance-Adaptive (MM-A), 45%; Methadone Maintenance-Change Oriented (MM-CO), 38%; Therapeutic Community-Short Term (TC-ST), 75%; Therapeutic Community-Modified (TC-M), 59%; Therapeutic Community-Traditional (TC-T), 72%; Drug Free-Adaptive (DF-A), 70%; Drug Free-Change Oriented (DF-CO), 78%; Inpatient Detoxification (IPDT), 66%; Inpatient Detoxification with Methadone (IPDT-M), 58%; Outpatient Detoxification (OPDT), 86%; and Outpatient Detoxification with Methadone (OPDT-M), 80%.

Examination of treatment disposition by type of treatment showed that the percentage still in treatment a year after admission was highest in methadone maintenance treatment (46%), but there were 9% more patients in MM-CO who either completed or were still in treatment than in MM-A. The most frequent category of termination was quitting in both MM treatments. MM-CO had a larger percentage who were expelled (10% vs. 5%), which was probably related to the more highly structured approach of this treatment in comparison to MM-A. In relation to time in treatment before a termination occurred, it was found that the MM-CO terminees tended to stay in longer than the MM-A terminees. Approximately 41% of the MM-A terminees left treatment within 4 months of admission, while only 26% in MM-CO terminated this soon.

The most prominant treatment disposition category in all other treatments was termination by quitting. This form of termination accounted for 60% of the patients in therapeutic communities, 64% in drug-free treatment, and 67% in detoxification. The categories were much smaller for completed treatment (10% in TC, 14% in DF, and 21% in DT) and still in treatment (17% in TC, 8% in DF, and 0% in DT). There were some interesting differences, however, between types of treatment within these major modalities.

Based on retention in treatment, therapeutic communities generally appeared to be effective for only a small proportion of DARP drug users. The longer-term traditional approach (TC-T) had the largest percentage of patients still in treatment a year after admission, 22%, compared to 17% in TC-M and 8% in TC-ST; on the other hand, TC-T had the smallest percentage of completions, 2%, compared to 19% in TC-M and 16% in TC-ST. Time in treatment before termination was generally similar among the TC types, except that a larger percentage of the TC-T terminees left treatment during the first 30 days (43%), compared to TC-M (29%) and TC-ST (26%). Also, in comparison to TC-T and TC-ST, there were fewer terminations in TC-M for quitting but more due to program expulsion.

In terms of retention, the drug-free treatment types were also effective for only a small percentage of the patients treated. Nevertheless, the two outpatient drug-free treatments were not equally successful since 21% of the patients in DF-A completed treatment, in contrast to only 6% in DF-CO. On the other hand, DF-CO had a larger percentage of patients still in treatment after a year (12%) than DF-A (5%). Considering time

in treatment, 39% of the terminees in the more structured approach of DF-CO terminated during the first 30 days (compared to only 11% in DF-A), and DF-CO also included more terminations due to quitting (71%, compared to 59% in DF-A).

With regard to detoxification, more inpatients being detoxified completed treatment (33% in IPDT and 30% in IPDT-M) than outpatients (12% in OPDT and 18% in OPDT-M). Time in treatment was short, of course, for terminees in each of these detoxifications.

Treatment Retention in Relation to Patient Characteristics

Patient classification variables were also examined in relation to termination rates and treatment tenure. With regard to termination rates, a series of univariate and multivariate analyses were conducted in order to identify predictors of termination within each treatment. Generally, race-ethnic group was found to be related to termination in most of the treatments, and because of this, the relationships to termination of the other patient classification variables were investigated within race-ethnic groups as well as across race-ethnic groups. These findings are summarized in Table 1. Within treatment types, it indicates the variables predictive of termination, either for a particular treatment (that is, for all patients in that treatment) or for race-ethnic groups in particular treatment types. The direction of the relationship of each variable to higher rates of termination is also indicated.

The differences between the types of variables important to prediction of termination in the two MM treatments suggest that they are differentially effective in retaining in treatment different types of patients. Of all the variables related to termination in MM-A, age was most strongly related. It appears significant that the patients most likely to remain in MM-A were those over 40 years of age. It may be that this type of treatment provides a convenient alternative to older patients who are tired of hustling for their drugs in the street. The other attributes associated with lower termination rates in MM-A were also age-related; they include previous treatment for drug abuse, greater family responsibility, and having started drug use at an older age. On the other hand, the more structured MM-CO type appeared to hold more younger patients (under 23) for longer periods of time than the MM-A treatment.

In the therapeutic communities, the variables related to termination also suggest that the different types of therapeutic communities were differentially effective in retention of patients with different backgrounds. The traditional therapeutic community (TC-T) was somewhat more effective in holding older patients than younger ones, was somewhat more effective with patients who had relatively higher levels of education, and, as in the other types of therapeutic communities, was more effective with holding males than females.

In the modified therapeutic community (TC-M), the results suggest that within the White sample, females were more likely to terminate than males; in the Black sample, age was important in

that youth and patients with no previous treatment were more likely to terminate treatment. Age and primarily age-related variables were also found to be the variables most predictive for patients in the short-term TC-ST, since higher rates of termination were found for youth, daily heroin users, and those with a relatively high record of pretreatment employment. The relatively small smaple sizes on which these results for TC-ST are based, however, suggest caution in their interpretation.

Although the predominant age group in the TC treatment types were youths between 18 to 20, it is noteworthy that the younger groups were found to have higher rates of termination than older patients in each of the TC treatment types. Thus, even though the TC types generally admitted younger patients, they also reported higher termination rates among younger groups.

Terminations in the drug-free treatments were particularly related to race-ethnic group in that Whites had a lower termination rate than Blacks in both DF-A and DF-CO (the other groups were not sufficiently represented to warrant interpretation). A related finding was that there were higher rates of termination for daily opioid users (of which a large proportion were Blacks).

Conclusions

In this brief summary of results, the "holding power" of different approaches to treatment and how certain patient characteristics are involved were examined. In all treatments, rates of termination prior to completion of treatment was high, particularly for the treatments not involving methadone maintenance.

Almost three-fourths of the patients in these treatments terminated prior to treatment completion, and most of the terminations were due to quitting. Furthermore, it was found that of the patients who terminated, a large number left within a month after admission and over half were gone within 3 months.

In terms of patient characteristics which were related to retention, older patients in all types of treatment were less likely to terminate than younger patients. Even among patients who terminated during the first 12 months after admission, older ones tended to stay longer before leaving. Thus, age was related in a consistent manner with maintenance as well as drug-free oriented programs. Other more treatment-specific relationships involved the trend for females to have higher rates of termination from therapeutic communities, and the tendency for patients who used opioids daily prior to treatment to be less likely than non-daily users to remain in drug-free programs.

Tenure in treatment, of course, does not represent by itself a sufficient criterion for the evaluation of treatment effectiveness. Nevertheless, most treatment programs consider some minimum period of time in treatment to be necessary before the effects of therapy can be realized. In most cases, it is clear from the present results that the treatments offered by community programs generally represented by the DARP have not been able to retain patients for the desired periods of time. This is evident by the rates of treatment terminations, particularly due to quitting at the patient's choice. The rates of treatment completions and percentages of patients still in treatment after a year were also

generally low, indicating that relatively few patients were able to fulfill basic expectations of the treatment regimes. The reasons for this are not easily determined, but findings such as those reported in this study identify certain problem areas concerning retention which are expected to be of interest to treatment p nel and suggest that program changes and development could benefit by taking into account patient characteristics of the clientele being served by the treatment agency.

References

Cole, Steven G. and Watterson, Olive. Development of a treatment typology for drug abuse in the DARP: 1971-1972 admissions. IBR Report 74-16, Texas Christian University, 1974.

TABLE 1

Characteristics Associated with Patients who Terminate for Adverse Reasons by Treatment Types

Treatment	Patients	Characteristics of Patients who Terminate
MM-A	Blacks, Mexican-Americans, & Whites	Youth No previous treatment No family responsibility Early age at drug involvement
MM-CO	Puerto Ricans only	Criminal history indicating many arrests and convictions Low educational level Poor employment record Early age at drug involvement
TC-ST	Blacks and Whites	Daily heroin users Poor employment record Many dependents Youth
TC-M	Whites only	Females
	Blacks only	Youth No previous treatment
TC-T	Blacks and Whites	Female Youth Low educational level
DF-A	Blacks, Mexican-Americans, & Whites	Daily heroin users 21-30 years of age Early age at involvement
DF-CO	Blacks only	Began drug involvement with hard drugs
IPDT	Whites only	Older patients H+Poly users
	Mexican-Americans only	Many dependents
	Blacks only	Criminal history indicating only a few arrests and convictions
IPDT-M	Blacks	No previous treatment Many dependents

TABLE 1 (Continued)

Treatment	Patients	Characteristics of Patients who Terminate
OPDT	Whites only	Daily heroin users
	Blacks only	Poor employment record
OPDT-M	Whites only	Higher for more than 6 months of military service
	Blacks	No previous treatment Court action at admission

Results of the Evaluative Studies of the Third Year

Richard L. Gorsuch

The results of drug-abuse treatments can be evaluated on both a during-treatment and a posttreatment basis. While posttreatment follow-up studies of the effects of treatment are of primary importance and command the most attention, they are most profitable when designed in relation to during-treatment measures, as in the DARP program. But the study of the immediate effects of treatments are useful in their own right. Evaluation of patient outcomes while the patient is still in treatment should generally show expected effects even though it may not be possible to determine whether they will persist after treatment is terminated. Such evaluation can also assist in answering questions concerning the relative efficacy of different approaches to treatment.

The data presented here are selected results from a major study of patient outcomes during treatment for the Cohort 2 DARP sample (Gorsuch, Abbamonte, and Sells, 1974). The first set of results involves a gross comparison of treatment types with respect to criterion indices; these results, based on all patients in each treatment, show mean changes from pretreatment both to the first report period (SER 1) and to the mean across measures taken during treatment on each criterion. The second set of results involves more detailed analyses of selected treatments to determine where selected patient and treatment characteristics were related to the criteria. These analyses, explained below, indicate the proportion of the total variance in each criterion accounted for by baseline measures, ethnic group, age, drug use pattern, treatment type, time in treatment, and by various interactions of these variables.

Method

The subjects for the evaluation study have already been described. The

final research sample of 12,297 patients represents 31 agencies located throughout the major regions of the United States and Puerto Rico. Separate analyses were carried out for males and females because it was felt that the base rates for several criteria were not comparable for the two sexes. The total sample was partitioned also by treatment modality for the analyses of patient and treatment characteristics. These analyses necessitated complete data on the variables included; the number of patients in the analysis subsamples are reported in the tables.

The criteria used in this study were selected from those reported earlier. They included productive activities, unemployment, alcohol use, opioid use, non-opioid use, and criminal activities. These were all scaled so that a high score (4) is unfavorable and a low score (1) is favorable. These criteria were relatively independent except for productive activities and unemployment which overlap by definition. Separate analyses were computed for each criterion and the overlap between productive activities and unemployment is taken into account in the discussion.

The analyses performed were conducted in the context of the general linear model as set forth in Cohan (1968) and in Ward and Jennings (1973). Some of the analyses involved simple comparisons of means (t tests) and others involved analyzing variances by a combined regression analysis/analysis of variance approach.

Analyses

Gross assessment of outcomes. In order to assess gross outcomes of the patients in each treatment while they were still undergoing treatment, two sets of correlated t tests were used. The first set of correlated t-tests compared the scores on each of the criteria at the time of admission with the scores for the same patients at the end of the first report period. The

second set of t tests compared the scores at admission with the mean of the scores on the criteria reported for each patient for as many SER's as were available. The simple correlated t test was utilized in order to gain a gross impression of the changes observed for each treatment type. In this phase, analysis of variance was rejected as inappropriate because treatments were confounded with many other effects, including agencies, regions, types of patients, time spent in treatment, and the level of risk (in relation to the criterion dimensions) associated with residential, inpatient, and outpatient treatments.

Table 1 contains means for the males for all six criteria at admission, at the first report period (SER 1), and across treatments (Trt), for each treatment type. Table 2 includes the same data for the females. For each criterion, the tables contain the number of subjects, the three means, differences between the scores at time of admission and at each of the two later points in treatment, and an indication of the significance level of each difference reported. Unlike the other criteria, the data for unemployment include the numbers of subjects for the t tests comparing the unemployment scores at admission with the overall mean during treatment in addition to the numbers for the comparison of admission and SER 1 means. The numbers of subjects for these two t tests vary because unemployment scores were not computed for patients who were out of the labor market due to their being in residential or inpatient treatment programs unless those patients had evidence of availability for employment.

In examining Table 1 and Table 2, the implications of outpatient status, as in MM, DF, and DT-OP treatments, versus residential and inpatient treatments, such as TC and DT-IP, should be clearly understood. The criteria are appropriate to the outpatient treatments and changes in favorable directions

should be expected for them as a result of the treatment. On the other hand, the results for the residential and inpatient treatments, in which the treatment environments isolate patients from much of the risk associated with the time they spend in the community, should be evaluated mainly to determine whether the isolation was effective.

An examination of Tables 1 and 2 suggests the following conclusions:

1. Patients in MM programs showed improvement in respect to productive activities and unemployment. This was not found in DF programs. The results for TC were as expected, although they show that small numbers of TC patients attained the status that permitted arrangements for employment.

2. Alcohol use decreased in all programs except MM-CO.

3. The use of opioids decreased sharply in all programs to considerably less than was shown at admission. OP-DT showed the least change among the outpatient modalities treating heavy opioid users.

4. The use of nonopioid drugs decreased in all programs.

5. Criminal activities showed reductions in all programs.

6. Except for unemployment, most of the changes occurred during the first report period.

7. The changes found for male and female subsamples were generally comparable.

Differential assessment of outcomes. Further analyses were undertaken to assess the changes observed as a function of pretreatment (baseline) status, patient characteristics, time in treatment, and treatment type. These analyses utilized the linear model to test for significant relationships between the selected variables and the means of the criterion measures during treatment. Since performance during treatment can be expected to be partially a function of the level of the criterion at the time of admission, the scores representing

admission status were treated as covariates. The following variables, or factors, were included as independent variables: ethnic group, age (including linear and quadratic components), pretreatment drug use pattern, treatment type, and time in treatment.

As mentioned in a previous paper, the patients were distributed unequally across all possible cells formed by crossing these factors and the factors were therefore intercorrelated. To provide for independent significance tests, the analyses were conducted sequentially. First, ethnic group was tested to determine if it contributed significantly to predicting a criterion over the covariate; then age was evaluated to determine if it added to the cumulative variance accounted for by ethnic group and the covariate, and so on through the remaining factors. The algorithms and computer programs were based on Overall and Spiegel (1971) and Gorsuch (1973).

The disproportionate cell frequencies in the data matrix implied that the factors could not be investigated independently of the interactions since what one would normally consider main effects overlapped with the interactions. For example, the Puerto Rican patients in methadone maintenance were almost all in MM-CO, the change oriented treatment type, and were generally younger than the majority of Mexican-American patients who, in turn, were almost all in MM-A, the adaptive methadone treatment type. Testing for the increase in variance accounted for by ethnic group therefore includes testing for components of the interaction among ethnic group, age, and treatment type. In a similar manner, the highest order interactions were not separable. Hence, separate tests for higher order interactions were not possible in the traditional analysis of variance sense. Instead, it was possible to test whether the combined interactions represented by the individual cells within which the patients fell added significant variance over and above the variance accounted for by

the main effects of the factors included in the patient profile. Since many of the individual cells formed by crossing the factors contained only one or two subjects, the test for the additional effects of individual cells was computed only for those cells with fifteen or more patients. The analysis can be considered a fixed effects analysis of variance with a Case I division (Gorsuch, 1973) of the overlapping variances and an overall test for all interactions not confounded with the main effects.

The analyses for differential treatment effects were computed separately by modality and only for the outpatient treatments. The residential and inpatient treatment environments restrict the activities of patients so that they are best considered as not at risk. The sexes were analyzed separately since most of the criteria were not directly comparable. Finally, only those treatment modalities with at least 500 patients were included in these analyses, which were further restricted to subjects for whom all of the data were available. Missing data were not a significant problem for MM or DF patients, but resulted in a major loss (43%) for the short-term male DT treatment. Hence, three analyses are reported here: 1) methadone maintenance, male, 2) methadone maintenance, female, and 3) drug-free, male.

The results of the three linear model analyses outlined above are presented in Tables 3 thru 8, with a pair of tables for each. In the first of each pair of tables (3, 5, and 7), the significant and nonsignificant effects are summarized by giving the percent of variance attributable to each factor over and above all previously evaluated factors with the results of the significance tests. In the second table of each pair, significant effects which accounted for at least 1% of criterion variance are presented in more detail. These latter tables (4, 6, and 8) present, first, the number of subjects in the analysis, then the raw means at admission and during treatment, the

difference between those two means, and the adjustment to the during-treatment mean necessitated by the previously extracted variables. In the case of ethnic group, the "previously extracted variables" consisted of only the pretreatment admission scores. In the case of treatment type, the adjustment included the scores at admission and all previously extracted factors (ethnic group, linear and quadratic age, and drug use pattern). The fact that the adjustments computed were usually trivial and would seldom influence the interpretation indicates that the main factors were relatively uncorrelated and suggests that the order of extraction is not an important determiner of the results. The concrete results are presented in the second table of each pair; however these tables display only those results which were significant in the preceding table of the respective pairs.

Results and Discussion

Time will not permit a detailed review of all the results. The following comments refer to the more significant, interesting points and the reader may examine the tables in more detail at his leisure. The results are organized by treatment modality.

Methadone maintenance treatments. It will be recalled that Tables 1 and 2 showed a significant reduction of deviant behavior on all six criteria for men in both MM treatments and for women on all but alcohol use in MM-A and on all but unemployment and alcohol use in MM-CO. The reductions were most substantial for both sexes on opioid use, with criminal activities second, and nonopioid use third. The criterion variable, productive activities, which includes role-related activities such as homemaking and school attendance along with legitimate jobs, and was developed to reflect the status of females more equitably than does unemployment, shows gains for women comparable to those for men. With the exception of unemployment, the profiles of men and

women patients across all criteria are remarkably similar for both MM treatments. However, the explanation of these results, in terms of pretreatment variables, patient characteristics, and treatment variables, is the critical problem.

In the MM samples, ethnic group was regrettably confounded with treatment type (Puerto Ricans primarily in MM-CO and Mexican-Americans in MM-A) and with age (Mexican-Americans, followed by Blacks, were oldest and Puerto Ricans and Whites younger). MM males were generally older than females.

The analyses of MM treatments presented in Tables 3 and 4 (men) and 5 and 6 (women) show many similarities as well as some differences. The proportions of criterion variance accounted for by pretreatment level (the covariate) and the factors of ethnic group, age, drug use pattern, treatment type, and time in treatment are very similar for productive activities and unemployment. In both cases between 26 and 29% of criterion variance is accounted for, with the largest share associated with the pretreatment level; the zero-order correlations for the covariate with criterion means of productive activities and unemployment, respectively, are .41 and .46 for men and .30 and .41 for women. These results indicate that those who work, engage in homemaking, and attend school immediately prior to entering treatment are most likely to be engaged in productive activities during treatment. Nevertheless, significant differentiation of these outcomes was found, attributable to ethnic group, treatment type, and time in treatment. The greatest gains on productive activities were by Puerto Ricans of both sexes, patients in MM-CO, particularly women, and those who remained in treatment 12 months or longer. On reduction of unemployment, MM-A was more effective, with the greatest gains by White males and Black and Mexican-American females.

MM-A was more effective than MM-CO in relation to reduction of alcohol

use, although the pretreatment level of alcohol use accounted for more variance than any of the other factors, including treatment. Time in treatment, favoring those who remained 12 months or longer, ethnic group, favoring Black males and White females, and age, favoring younger patients of both sexes, also accounted for significant variance.

Although MM-CO was superior to MM-A in reduction of opioid drug use, a significant reduction was also found for longer time in treatment and Puerto Ricans, who had 97% of their MM patients in MM-CO. On opioid use, nonopioid use, and criminal activities -- where both MM programs had their most substantial effects -- pretreatment levels were least correlated with the during treatment measures, indicating more pervasive effects. Puerto Ricans of both sexes reduced nonopiate use most; on this variable there were no significant main effects, although the interaction variance attributable to individual cells was significant for males. Time in treatment, again favoring longer-term participation in treatment, was a significant factor associated with reduction of criminal behavior in both treatments for both sexes; the greatest gains were observed for Black males and for females under age 18.

A summary of the findings for males in MM is as follows:

1. Productive activities and unemployment. MM patients generally showed significant improvement over pretreatment levels in productive activities and a decrease in unemployment, but variations were found among ethnic groups, treatment types, and time in treatment (on productive activities). Puerto Ricans, at both admission and during treatment, were most highly engaged in productive activities and Mexican-Americans had the highest percentages employed. Correcting for pretreatment levels of productive activities and unemployment, the effects for both variables were greater for the

Puerto Rican and White groups than for the Black and Mexican-American groups. Patients in treatment type MM-A had better initial scores and slightly better results on these two criteria than did those in MM-CO, and patients who remained in treatment longer became more involved in productive activities than shorter-term patients.

2. Alcohol use was significantly related to ethnic group, age, and treatment type. Blacks in MM treatments had significant reductions in alcohol use, while Mexican-Americans increased; both of these groups had higher pre-treatment alcohol use than Puerto Ricans and Whites, who showed no change. Younger patients decreased alcohol use more than older ones; indeed the over-30 groups consumed more alcohol during treatment than those under 25 did before treatment. Patients in treatment type MM-A, but not in MM-CO, showed a reduction in alcohol use.

3. Drug use. Overall reduction in use of opioid and (to a lesser extent) nonopioid drugs was significantly related to ethnic group, treatment type, and time in treatment. Whites started out lower than other groups and showed some decrease. Puerto Ricans showed the greatest decrease in both of these drug categories. MM-CO was slightly more effective for opioid use (possibly because of the greater use of random urine tests). For nonopioid drugs, those who stayed longer in treatment had higher pretreatment use levels and also showed a greater decrease during treatment than shorter-term patients.

4. Criminal activities. The reduction of criminal activities from pre-treatment levels was significant, with no differences in reduction among ethnic groups. Puerto Ricans were less involved in criminal activities than the other groups both before and during treatment. No differences were found related to treatment type, but those who were in treatment longer reduced criminal activities the most.

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The following is a summary of results for females in MM.

1. Productive activities and unemployment. These results are generally similar to those for males in MM; however, females show up better on productive activities than they do on employment. Ethnic group, treatment type, and time in treatment contribute to results on these variables. Whites were most often employed and in productive activities and Puerto Ricans increased their level of non-employment productive activities (homemaking and attending school) from admission to treatment. Females in MM-A showed less unemployment and more productive activities than those in MM-CO at both admission and treatment. Greater time in treatment was associated with more change toward increased productive activities.

2. Alcohol use was associated with ethnic group, age, and treatment type. The Mexican-American and Puerto Rican females in MM had least alcohol use at admission and did not change; Whites decreased in alcohol use across time to about the level of the Mexican-American and Puerto Rican groups, while Blacks were the highest at admission and remained the highest. The patients in MM-A treatment experienced a decrease in alcohol use, while those in MM-CO increased slightly.

3. Opioid use was influenced only by time in treatment. Females who spent a longer time in treatment had a greater decrease in opioid use.

4. Nonopioid use by females in both MM treatments was reduced significantly; ethnic group and treatment type were both related to this reduction. Mexican-Americans used the least nonopioid drugs both before and during treatment, while Puerto Ricans used the most.

5. Criminal activities showed reductions in both MM treatments, with age and time in treatment being differentially associated with the reductions. Younger, female patients under 18 were more involved in criminal activities

than any other age group. Improvement was positively associated with time spent in treatment.

Discussion of results for MM treatments. The MM treatments, MM-A and MM-CO, both present a picture of generally successful outcomes during treatment, based on the data analyzed. The results were most consistent and most dramatic for opioid use, criminal activities, and nonopioid use and there were variations in outcome effectiveness on all six criteria attributable to other factors analyzed. Although the results on productive activities and unemployment were not as encouraging as would be desired, MM-A was more effective than MM-CO. These results may reflect differences between these two types of treatment environment, with MM-A more flexible and MM-CO more regimented and time-consuming during the period of treatment. MM-A apparently also placed more emphasis on the development of practical skills, while MM-CO was more concerned with character change. Posttreatment criteria will be important in further evaluation of these outcomes.

MM-A also had a greater reduction of alcohol use for males; females showed no change in either treatment. The results on opioid use favored MM-CO and may well reflect the stricter regime and manner of use of urine tests in this treatment. Longer time in treatment was significantly related to productive activities, alcohol use (in MM-A), opiate use, and criminal activities. The concentration of Puerto Rican patients of both sexes in MM-CO may tentatively be regarded as a combined main effect of this ethnic group and this treatment; measures favoring MM-CO usually favored Puerto Ricans also. A similar linkage of effects attributable to MM-A can be seen in the corresponding results for Blacks (representing 66% of MM-A patients) and Mexican-Americans (88% of whose MM patients were in MM-A).

Thus it appears that there was no one-sided superiority of one MM

treatment over the other, but rather differential effects related to particular features of these treatments. The concentration of Puerto Rican patients in MM-CO, as mentioned above, and of Mexican-Americans in MM-A prevented any comparison of the two treatments for these groups.

Drug-Free treatments, males. As in the MM treatments, there were linkages in DF between Puerto Ricans and the change-oriented treatment (DF-CO) and Mexican-Americans and the adaptive treatment (DF-A); the proportions of Blacks and Whites in both treatments were rather well balanced, although with a small plurality in DF-A. The Mexican-American males in DF-A were the oldest, with a median age of 28, and the Whites were youngest, with a median age of 20. Patients in DF-A had a median age two to three years greater than those in DF-CO in all four ethnic groups.

The changes from pretreatment to during treatment for DF-A and DF-CO, as shown earlier in Table 1, were significant for both treatments on alcohol use, opioid and nonopioid drug use, and criminal activities; a significant reduction in unemployment was found for DF-A. The change means for productive activities were zero for DF-A and reversed for DF-CO. In order of magnitude, the changes on nonopioid drug use were greatest followed closely by opioid drug use and criminal activities, and then by alcohol use. The significant change on unemployment in DF-A, but not in DF-CO, probably reflects the more laissez-faire atmosphere of an adaptive treatment approach compared to the more demanding and time-consuming DF-CO treatment environment. An analysis of the significance of pretreatment levels and the other factors examined in accounting for criterion variance is shown in Tables 7 and 8.

Pretreatment levels accounted for approximately half of the total criterion variance accounted for on productive activities (17% out of 34%), on unemployment (16% out of 32%) and on opioid use (16% out of 26%). On the

other criterion variables, pretreatment influence was lower but more important than any other factor.

A summary of the results for DF males is as follows:

1. Productive activities and unemployment. On these criteria only DF-A showed a significant reduction in unemployment. Among ethnic groups, White DF patients had higher levels of pretreatment productive activities and were more often employed prior to admission and during treatment, while Puerto Ricans showed the highest unemployment levels, both before and during treatment. Daily users of Heroin had the most pretreatment and during treatment unemployment and unproductive activities while the Poly and LDO+ showed the best scores. The H+ and H+P groups changed for the worse while the Poly group changed for the better on both criteria. Patients in DF-A showed slight improvements in employment while those in DF-CO showed slight decrements on these two criteria. Those who remained longer in treatment were also those with the best employment and productive activity means on both occasions.

2. Alcohol use. While all age groups showed a decline in alcohol use from pretreatment to treatment, older patients consumed more alcohol both at admission and during treatment than did the younger patients. Reduction of alcohol use was greater in DF-CO than in DF-A.

3. Opioid use. Reduction of opioid use was significant in both DF treatments, but greater in DF-A than DF-CO. This result was highly pronounced for Blacks, Puerto Ricans, and Mexican-Americans, but not for Whites. However, the pretreatment level for Whites was much lower than that of the other groups and close to their during-treatment means. Length of time in treatment was negatively associated with reduction of opioid use during DF treatments; the reduction was greatest for those who remained for only one SER.

4. Criminal Activity. The small but significant reduction of criminal

activity in DF treatments was not related to treatment type. It was related to ethnicity and drug use pattern. Whites and Puerto Ricans had lower pretreatment criminal activity rates than did the other ethnic groups, but Whites and Mexican-Americans had the greatest mean reduction. Those with drug use patterns involving heroin had higher levels of pretreatment criminal activity and also greater reduction during treatment.

Discussion of results for DF treatments. The DF treatments, DF-A and DF-CO, generally appear effective on the criteria of primary concern: opioid use, nonopioid use, alcohol use and criminal activities. However, DF-CO and, to a lesser extent DF-A, were less associated with improvement in productive activities and unemployment than appeared to be the case for the MM treatments; the analysis did suggest that part of the differences between MM and DF might disappear if patients remained in DF longer. The same factors which lead MM-CO to be less effective on these criteria may also be active in the DF treatments. The only other difference between the two treatment types was on alcohol use where DF-CO was associated with a greater reduction in use.

Concluding Comment

We have presented gross results, with *t* tests for most of the 12,297 patients in the final research sample of DARP Cohort 2, and more definitive linear model analyses for three important subsamples: males in Methadone Maintenance treatments, females in Methadone Maintenance treatments, and males in Drug Free treatments.

The gross results gave an encouraging picture overall of successful outcomes for outpatient treatments on most criteria and of outcomes expected for isolated treatment environments for the residential and inpatient treatments. These results, although limited to gross changes from pretreatment levels to criterion status during treatment for all patients without reference

to time in treatment, ethnic group, drug use pattern, or age, were nevertheless important in two respects. First, they reflect rather clearly the fact that the outcomes obtained were most extensive for opioid drug use, nonopioid drug use, and criminality, and least impressive for productive activities and employment. Second, they showed that for most criteria the major changes obtained occurred within the first 60 days in treatment; in the case of unemployment, only one treatment, MM-A, showed significant changes that early, but these appear on subsequent analysis to reflect pretreatment levels more than outcome due to treatment.

The linear model analyses show the total amount of criterion variance accounted for and the portions attributable independently to pretreatment levels, ethnic group, age, drug use pattern, treatment type, time in treatment, and interactions. Pretreatment levels were most important for productive activities and unemployment in all three analyses; significant effects for unemployment were found for methadone maintenance treatments only. Effects attributable to other factors were summarized. Here differential effects of treatments with ethnic groups were indicated, but these are difficult to interpret because of the uneven distribution of ethnic groups over treatments. Age differences among ethnic groups further complicated the interpretation.

Several general conclusions nevertheless appear warranted from the three linear model analyses of the outpatient treatments. First, it appears that all programs have the same effect on opioids, nonopioids, criminal activities and alcohol use. However, methadone maintenance was the only treatment modality associated with any improvement in productive activities or decrease in unemployment. In the realm of employment, the Blacks and Mexican-Americans showed the least change; in part this reflects the fact that the Mexican-Americans had higher pretreatment employment levels and in part the

fact that employment changed least of all variables.

Younger patients appeared to be helped less than older patients, although this effect did not occur in all analyses. However, it is of interest that these results, as well as those for unemployment, are in agreement with those found by Spiegel and Sells (1973) for DARP Cohort 1.

Occasional results were found showing that the adaptive treatments were slightly more associated with patients entering into productive activities and increasing employment whereas the change-oriented treatments were slightly more associated with reduced drug use. It is likely that the differences in productive activities and employment may be a function of the fact than the adaptive treatment approach is less disruptive of the patient's day then is the change-oriented approach; the latter usually requires the individual to take time off from work and be involved in extensive therapeutic and other activities. The change-oriented treatments may be more effective in reducing drug use because they are more directive and thus concentrate on drug use as a focal point or because those programs used more random urine testing. The use of random urine tests to detect drug use can be expected to be an outside manipulation which would reduce the average drug use level during treatment.

The limitations of the field experiment, that have been mentioned, particularly the exasperating distribution of patients over treatments but also the lack of definitive control groups, require that the results be viewed with caution. This may be partially offset by the internal consistency and conformity with rational expectation, and the patterning of the results obtained.

In concluding, it must be emphasized that this is only a study of the effects during treatment, and of the first year of treatment at that. While this is useful preliminary knowledge, the effects of the treatments after

two, three, or five years is also critical. In particular, the early effects observed and the increased effectiveness of treatment over a period of one year (for those who remain) may prove to be only the effects of control and not therapy. This is a hypothesis to be tested upon followup when the close restrictions of inpatient treatment are removed. It is important that the posttreatment followup of these patients will now be possible.

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FOOTNOTES

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TABLE 1

Treatment Type Means for Admission, SERl and Treatment: Males

	MM-A	MM-CO	TC-ST	TC-M	TC-T	DF-A	DF-CO
PRODUCTIVE ACTIVITIES (-)							
Adm. - N	2067	1678	305	430	650	854	671
Mean	1.5	1.7	1.6	1.7	1.7	1.5	1.5
SERl - Mean	1.4	1.6	1.7	1.8	1.9	1.5	1.6
Dif.	- .1**	- .1**	.1**	.1*	.2**	.0	.1
Trt. - Mean	1.4	1.5	1.7	1.7	1.9	1.5	1.6
Dif.	- .1**	- .2**	.1**	.0	.2**	.0	.1
UNEMPLOYMENT							
Adm. - N	2059	1673	303	430	647	846	670
Mean	2.8	3.2	3.2	3.5	3.3	3.0	3.2
SERl - Mean	2.6	3.1	3.7	3.9	4.0	3.0	3.5
Dif.	- .2**	- .1	.5**	.4**	.7**	.0	.3**
Trt. - N[a]	2037	1642	92	103	80	775	570
Mean	2.5	2.9	2.4	2.4	2.4	2.8	3.2
Dif.	- .3**	- .2**	- .5**	- .9**	- .8**	- .2**	.1
ALCOHOL							
Adm. - N	1985	1602	280	392	580	729	633
Mean	1.7	1.7	1.8	1.7	1.7	1.8	1.9
SERl - Mean	1.5	1.7	1.2	1.0	1.0	1.4	1.3
Dif.	- .2**	.0	- .6**	- .7**	- .7**	- .4**	- .6**
Trt. - Mean	1.5	1.7	1.2	1.1	1.0	1.4	1.3
Dif.	- .2**	.0	- .6**	- .6**	- .7**	- .4**	- .6**
OPIOID USE							
Adm. - N	2032	1696	282	429	651	794	652
Mean	3.6	3.7	2.6	3.3	3.4	2.6	2.3
SERl - Mean	2.0	1.6	1.3	1.6	1.0	1.6	1.6
Dif.	-1.6**	-2.1**	-1.3**	-1.7**	-2.4**	-1.0**	- .7**
Trt. - Mean	1.9	1.5	1.2	1.5	1.1	1.6	1.6
Dif.	-1.6**	-2.2**	-1.4**	-1.8**	-2.3**	-1.0**	- .7**
NON-OPIOID USE							
Adm. - N	2021	1694	279	427	589	769	647
Mean	2.2	2.2	3.0	2.7	2.6	2.5	2.6
SERl - Mean	1.5	1.6	1.3	1.2	1.0	1.5	1.4
Dif.	- .7**	- .6**	-1.7**	-1.5**	-1.6**	-1.0**	-1.2**
Trt. - Mean	1.5	1.5	1.3	1.2	1.0	1.5	1.4
Dif.	- .7**	- .7**	-1.7**	-1.5**	-1.6**	-1.0**	-1.2**
CRIMINAL ACTIVITIES[b]							
Adm. - N	1937	1585	277	406	559	768	639
Mean	2.2	2.3	2.4	2.6	2.5	2.2	2.0
SERl - Mean	1.2	1.1	1.1	1.0	1.0	1.3	1.2
Dif.	-1.0	-1.2	-1.3	-1.6	-1.5	- .9	- .8
Trt. - Mean	1.2	1.1	1.1	1.0	1.0	1.3	1.2
Dif.	-1.0	-1.2	-1.3	-1.6	-1.5	- .9	- .8

[a]The N's vary from SERl to Trt. because Unemployment scores were not computed for residential and in-patients unless they had evidence of availability for employment.

[b]The scores prior to admission and post-admission are not strictly comparable.

	DT-IP	DT-IP/M	DT-OP	DT-OP/M	Misc.
PRODUCTIVE ACTIVITIES (-)					
Adm. - N	483	109	941	324	264
Mean	1.7	1.7	1.6	1.6	1.6
SER1 - Mean	1.8	1.8	1.6	1.6	1.7
Dif.	.1**	.1*	.0	.0	.1*
Trt. - Mean	1.8	1.8	1.6	1.6	1.7
Dif.	.1**	.1*	.0	.0	.1**
UNEMPLOYMENT					
Adm. - N	481	108	904	320	261
Mean	3.3	3.5	3.2	3.1	3.2
SER1 - Mean	3.8	3.8	3.5	3.3	3.7
Dif.	.5**	.3*	.3**	.2*	.5**
Trt. - N[a]	46	28	866	301	185
Mean	1.9	3.1	3.4	3.2	3.5
Dif.	- .7**	- .1	.2**	.1*	.4**
ALCOHOL					
Adm. - N	409	98	813	310	200
Mean	1.7	1.5	1.6	1.5	1.7
SER1 - Mean	1.1	1.1	1.3	1.2	1.3
Dif.	- .6**	- .4**	- .3**	- .3**	- .4**
Trt. - Mean	1.1	1.1	1.3	1.2	1.3
Dif.	- .6**	- .4**	- .3**	- .3**	- .4**
OPIOID USE					
Adm. - N	483	106	886	322	226
Mean	3.5	3.8	3.7	3.7	3.1
SER1 - Mean	1.5	1.8	2.1	2.3	1.7
Dif.	-2.0**	-2.0**	-1.6**	-1.4**	-1.4**
Trt. - Mean	1.5	1.8	2.2	1.7	1.7
Dif.	-2.0**	-2.0**	-1.5**	-2.0**	-1.4**
NON-OPIOID USE					
Adm. - N	455	103	749	297	205
Mean	2.0	2.3	2.4	2.2	2.4
SER1 - Mean	1.2	1.3	1.5	1.4	1.3
Dif.	- .8**	-1.0**	- .9**	- .8**	-1.1**
Trt. - Mean	1.2	1.3	1.5	1.4	1.3
Dif.	- .9**	-1.0**	- .9**	- .8**	-1.1**
CRIMINAL ACTIVITIES[b]					
Adm. - N	436	104	734	274	217
Mean	2.5	2.5	2.4	2.4	2.2
SER1 - Mean	1.3	1.3	1.5	1.6	1.3
Dif.	-1.2	-1.2	- .9	- .8	- .9
Trt. - Mean	1.3	1.3	1.5	1.6	1.3
Dif.	-1.2	-1.2	- .9	- .8	- .9

[a]The N's vary from SER1 to Trt. because Unemployment scores were not computed for residential and inpatients unless they had evidence of availability for employment.

[b]The scores prior to admission and post-admission are not strictly comparable.

Treatment Type Means for Admission, SER1 and Treatment: Females

	MM-A	MM-CO	TC-ST	TC-M	TC-T	DF-A	DF-CO
PRODUCTIVE ACTIVITIES (-)							
Adm. - N	715	382	143	108	239	320	235
Mean	1.7	1.8	1.6	1.8	1.8	1.5	1.4
SER1 - Mean	1.5	1.6	1.7	1.9	1.8	1.4	1.4
Dif.	- .2**	- .2**	.1*	.1*	.0	- .1	.0
Trt. - Mean	1.5	1.6	1.7	1.8	1.7	1.4	1.4
Dif.	- .2**	- .2**	.1	.0	- .1	- .1*	.0
UNEMPLOYMENT							
Adm. - N	714	382	143	108	239	318	235
Mean	3.5	3.8	3.4	3.6	3.5	3.3	3.4
SER1 - Mean	3.5	3.8	3.8	3.9	4.0	3.4	3.5
Dif.	.0	.0	.4**	.3*	.5**	.1	.1*
Trt. - N[a]	657	350	33	32	15	263	165
Mean	3.3	3.6	2.3	2.4	2.8	3.0	3.2
Dif.	- .2**	- .1	- .9*	-1.0*	- .1	- .2	- .1
ALCOHOL							
Adm. - N	685	374	133	95	208	281	218
Mean	1.5	1.5	1.6	1.7	1.5	1.5	1.7
SER1 - Mean	1.3	1.5	1.0	1.0	1.0	1.4	1.2
Dif.	- .2**	.0	- .6**	- .7**	- .5**	- .1*	- .5**
Trt. - Mean	1.3	1.5	1.0	1.0	1.0	1.4	1.2
Dif.	- .2**	.0	- .6**	- .6**	- .5**	- .1**	- .5**
OPIOID USE							
Adm. - N	702	381	140	104	234	298	228
Mean	3.6	3.8	2.5	3.4	3.2	2.3	2.0
SER1 - Mean	2.0	1.9	1.3	1.6	1.2	1.6	1.4
Dif.	-1.6**	-1.9**	-1.2**	-1.8**	-2.0**	- .7**	- .6**
Trt. - Mean	1.9	1.8	1.3	1.6	1.1	1.5	1.4
Dif.	-1.7**	-2.0**	-1.2**	-1.8**	-2.1**	- .8**	- .6**
NON-OPIOID USE							
Adm. - N	700	381	139	103	214	292	227
Mean	2.0	2.2	3.0	2.7	2.7	2.7	2.6
SER1 - Mean	1.4	1.7	1.4	1.1	1.1	1.6	1.4
Dif.	- .6**	- .5**	-1.6**	-1.6**	-1.6**	-1.1**	-1.2**
Trt. - Mean	1.4	1.7	1.4	1.2	1.1	1.6	1.3
Dif.	- .6**	- .5**	-1.6**	-1.5**	-1.6**	-1.1**	-1.3**
CRIMINAL ACTIVITIES[b]							
Adm. - N	666	370	138	103	198	295	219
Mean	2.0	2.2	2.0	2.3	2.2	1.8	1.6
SER1 - Mean	1.5	1.2	1.0	1.0	1.0	1.2	1.0
Dif.	- .5	-1.0	-1.0	-1.3	-1.2	- .6	- .6
Trt. - Mean	1.2	1.2	1.0	1.0	1.0	1.2	1.0
Dif.	- .8	-1.0	-1.0	-1.3	-1.2	- .6	- .6

[a]The N's vary from SER1 to Trt. because Unemployment scores were not computed for residential and inpatients unless they had evidence of availability for employment.

[b]The scores prior to admission and post-admission are not strictly comparable.

TABLE 2 Continued

	DT-IP	DT-IP/M	DT-OP	DT-OP/M	Misc.
PRODUCTIVE ACTIVITIES (-)					
Adm. - N	184	26	281	100	66
Mean	1.7	1.9	1.7	1.8	1.6
SERl - Mean	1.7	1.8	1.5	1.6	1.8
Dif.	.0	- .1	- .2**	- .2*	.2
Trt. - Mean	1.7	1.8	1.6	1.6	1.7
Dif.	.0	- .1	- .1**	- .2*	.1
UNEMPLOYMENT					
Adm. - N	180	26	280	100	66
Mean	3.6	4.0	3.6	3.7	3.3
SERl - Mean	3.9	4.0	3.8	3.5	3.8
Dif.	.3**	.0	.2**	- .2	.5*
Trt. - N[a]	9	4	231	89	38
Mean	2.9	4.0	3.7	3.5	3.5
Dif.	.5	.0	.1*	- .1	.3
ALCOHOL					
Adm. - N	165	25	251	88	54
Mean	1.6	1.4	1.5	1.5	1.6
SERl - Mean	1.1	1.1	1.3	1.3	1.3
Dif.	- .5**	- .3	- .2	- .2	- .3
Trt. - Mean	1.1	1.1	1.3	1.2	1.3
Dif.	- .5**	- .3	- .2	- .3	- .3*
OPIOID USE					
Adm. - N	186	27	269	99	58
Mean	3.2	3.7	3.7	3.8	3.0
SERl - Mean	1.6	1.9	2.3	2.3	1.7
Dif.	-1.6**	-1.8**	-1.4**	-1.5**	-1.3**
Trt. - Mean	1.6	1.9	2.4	2.3	1.6
Dif.	-1.6**	-1.8**	-1.3**	-1.5**	-1.4**
NON-OPIOID USE					
Adm. - N	169	26	231	96	56
Mean	2.3	2.3	2.3	2.0	2.6
SERl - Mean	1.2	1.3	1.5	1.6	1.3
Dif.	-1.1**	-1.0*	- .8**	- .4*	-1.3**
Trt. - Mean	1.2	1.3	1.5	1.6	1.3
Dif.	-1.1**	-1.0*	- .8**	- .4**	-1.3**
CRIMINAL ACTIVITIES[b]					
Adm. - N	166	25	220	92	55
Mean	2.1	2.5	2.1	2.2	1.8
SERl - Mean	1.2	1.2	1.4	1.5	1.2
Dif.	- .9	-1.3	- .7	- .7	- .6
Trt. - Mean	1.2	1.2	1.5	1.5	1.2
Dif.	- .9	-1.3	- .6	- .7	- .6

[a]The N's vary from SERl to Trt. because Unemployment scores were not computed for residential and inpatients unless they had evidence of availability for employment.

[b]The scores prior to admission and post-admission are not strictly comparable.

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Relationships of Patient Characteristics, Treatment Type, and Time in Treatment to the Criteria for Males in MM (N=2975)

Percent of Variance Attributable to Each Effect

	ACT.-	EMP.-	ALCOHOL	OPI.+U	NOP-D.	CRIM.
Covariate	17.2**	21.1**	9.0**	1.2**	2.1**	2.6**
Additional Factors:						
Ethnic Group	1.7**	1.2**	2.6**	6.6**	2.1**	1.6**
Age-linear	.3**	.0	2.5**	.4**	.1	.3
Age-quadratic	.0	.0	0.0	.0	.1	.1
Drug Use Ptn.	.3	.4	.4	.8**	.7**	.1
Trt. Type	2.9**	2.8**	2.1**	1.8**	.4**	.2*
Time in Trt.	1.6**	.1**	.1	2.0**	.0	2.5**
Individual Cells	2.3	2.0	2.3	3.3	5.4[a]	2.9
TOTAL	26.4%	28.4%	19.0%	16.0%	10.9%	10.4%

Cumulative Multiple Correlations

	ACT.-	EMP.-	ALCOHOL	OPI.+U	NOP-D.	CRIM.
Covariate	.41	.46	.30	.11	.14	.16
Additional Factors:						
Ethnic Group	.44	.47	.34	.28	.21	.20
Age-linear	.44	.47	.38	.29	.21	.21
Age-quadratic	.44	.47	.38	.29	.21	.21
Drug Use Ptn.	.44	.48	.38	.30	.23	.22
Trt. Type	.47	.51	.41	.33	.24	.22
Time in Trt.	.49	.51	.41	.36	.24	.27
Individual Cells	.51	.53	.44	.40	.33	.32
TOTAL	.51	.53	.44	.40	.33	.32

F-Ratios and Degrees of Freedom

	ACT.-	EMP.-	ALCOHOL	OPI.+U	NOP-D.	CRIM.	DF
Covariate	617.67**	796.93**	294.50**	35.30**	62.58**	78.68**	1/2973
Additional Factors:							
Ethnic Group	15.89**	11.43**	21.93**	52.94**	16.63**	12.51**	4/2969
Age-linear	12.47**	1.06	87.74**	12.27**	1.59	8.80**	1/2968
Age-quadratic	.27	.42	.05	.15	3.79	1.64	1/2967
Drug Use Ptn.	1.28	1.94	1.60	3.30**	2.79**	.56	8/2959
Trt. Type	110.68**	111.54**	73.62**	59.15**	13.38**	6.47**	1/2958
Time in Trt.	31.18**	16.41**	1.27	33.76**	.44	40.62**	2/2956
Individual Cells	.66	.59	.59	.81	1.26[a]	.68	136/2820

[a] indicates $p<.027$ * indicates $p<.025$ ** indicates $p<.01$

TABLE 4

Differences in Treatment Means for MM Males Associated with Discriminating Factors

	N	Raw Means Adm.	Raw Means Trt.	Diff.	Trt. Mean Adjustment for Covariates
A. Productive Activities (-)					
2. Ethnic Group (1.7% addl. var.)					
Black -Higher in H+C.	1536	1.61	1.49	-.1	-.01
PR -Younger; 97% in MM-CO.	711	1.62	1.40	-.2	-.01
MA -Older; higher in DUP H; 83% in MM-A.	221	1.42	1.30	-.1	.05
White -Lower in DUP H, H+C; higher in DUP H+B, Poly, LDO+, O Op+, NC.	471	1.54	1.35	-.2	.01
Other	36	1.53	1.40	-.1	.02
6. Treatment Type (2.9% addl. var.)					
MM-A	1606	1.52	1.37	-.2	-.02
MM-CO	1369	1.67	1.50	-.2	.02
7. Time in Treatment (2.9% addl. var.)					
No. of Report Periods					
2	372	1.56	1.49	-.1	.03
3-5	834	1.60	1.47	-.1	.0
6	1769	1.59	1.40	-.2	-.01
B. Unemployment					
2. Ethnic Group (1.2% addl. var.)					
Black -Higher in H+C.	1536	3.00	2.73	-.3	-.03
PR -Younger; 97% in MM-CO.	711	3.01	2.65	-.4	-.03
MA -Older; higher in DUP H; 83% in MM-A.	221	2.52	2.15	-.4	.15
White -Lower in DUP H, H+C; higher in DUP H+B, Poly, LDO+, O Op+, NC.	471	2.86	2.39	-.5	.03
Other	36	2.83	2.55	-.3	.04
6. Treatment Type (2.8% addl. var.)					
MM-A	1606	2.78	2.39	-.4	-.01
MM-CO	1369	3.13	2.87	-.3	.0

	N	Raw Mean Adm.	Raw Mean Trt.	Diff.	Trt. Mean Adjustment for Covariates
C. Alcohol Use					
2. Ethnic Group (2.6% addl. var.)					
Black -Higher in H+C.	1536	1.83	1.69	-.3	-.02
PR -Younger; 97% in MM-CO.	711	1.66	1.61	.0	.01
MA -Older; higher in DUP H; 83% in MM-A.	221	1.84	1.96	.1	-.02
White -Lower in DUP H, H+C; higher in DUP H+B.	471	1.41	1.36	.0	.06
Other	36	1.56	1.20	-.4	.04
3. Age (2.5% addl. var.)					
0-17	30	1.73	1.30	-.4	.04
18-20	360	1.64	1.40	-.2	.02
21-22	498	1.53	1.47	.0	.04
23-25	658	1.63	1.56	-.1	.04
26-30	645	1.81	1.69	-.1	-.01
31-40	555	1.86	1.87	.0	-.10
41-99	229	1.93	1.84	-.1	.01
Note: The younger groups contain more multiple drug users (H+C, H+B, H+, P+H, P).					
6. Treatment Type (2.1% addl. var.)					
MM-A	1606	1.72	1.54	-.2	-.04
MM-CO	1369	1.72	1.73	.0	.05
D. Opioid Use					
2. Ethnic Group (6.6% addl. var.)					
Black -Higher in H+C.	1536	3.69	1.82	-1.9	.00
PR -Younger; 97% in MM-CO	711	3.72	1.39	-2.3	.00
MA -Older; higher in DUP H; 83% in MM-A	221	3.84	1.96	-1.9	-.02
White -Lower in DUP H, H+C; higher in DUP H+B.	471	3.25	1.73	-1.5	.03
Other	36	3.67	1.71	-2.0	-.01
6 Treatment Type (1.8% addl. var.)					
MM-A	1606	3.57	1.88	-1.7	-.06
MM-CO	1369	3.72	1.52	-2.2	.07

TABLE 4 Continued

	N	Raw Mean Adm.	Raw Mean Trt.	Diff.	Trt. Mean Adjustment for Covariates
7. Time in Treatment (2% addl. var.)					
No. of Report Periods					
2	372	3.38	1.93	-1.5	.00
3-5	834	3.56	1.78	-1.8	.01
6	1769	3.73	1.64	-2.1	-.01
E. Non-Opioid Use					
2. Ethnic Group (2.1% addl. var.)					
Black -Higher in H+C.	1536	2.15	1.49	-.7	.00
PR -Younger; 97% in MM-CO	711	2.24	1.43	-.8	.00
MA -Older; higher in DUP H; 83% in MM-A	221	1.89	1.26	-.6	.02
White -Lower in DUP H, H+C; higher in DUP H+B.	471	2.02	1.67	-.4	.00
Other	36	2.50	1.76	-.7	-.03
8. Individual cells (5.4% addl. var.)					
The following cells had higher ($p<.025$) means after covariates were partialed out (identified by ethnic group, drug use pattern, treatment type and time in treatment): B, H, CO, 2; B, H, CO, 3-5; B, HC, CO, 2; W, H+B, CO, 2.					
The following cells had lower ($p<.025$) means after covariates were partialed out: B, LO+, A, 2; B, H+C, A, 3-5; B, NC, A, 3-5; W, NC, A, 6; PR, P+H, CO, 6.					
F. Criminality					
2. Ethnic Group (1.6% addl. var.)					
Black -Higher in H+C	1536	2.33	1.16	-1.2	-.01
PR -Younger; 97% in MM-CO	711	2.01	1.09	-1.0	.02
MR -Older; higher in DUP H; 83% in MM-A	221	2.38	1.30	-1.0	-.01
White -Lower in DUP H, H+C; higher in DUP H+B.	471	2.28	1.17	-1.1	.00
Other	36	1.89	1.10	-.9	-.02

TABLE 4 Continued

	N	Raw Mean Adm.	Raw Mean Trt.	Diff.	Trt. Mean Adjustment for Covariates
7. Time in Treatment (2.5% addl. var.) No. of Report Periods					
2	372	2.30	1.25	-1.0	.01
3-5	834	2.27	1.22	-1.0	.01
6	1769	2.22	1.10	-1.1	-.01

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TABLE 5

Relationships of Patient Characteristics, Treatment Type, and Time in Treatment to the Criteria for Females in MM (N=815)

Percent of Variance Attributable to Each Effect

	ACT.-	EMP.-	ALCOHOL	OPI.+U	NOP-D.	CRIM.
Covariate	9**	17**	6**	1**	1**	2**
Additional Factors:						
Ethnic Group	1*	2**	2**	0	2**	0
Age-linear	0	0	2**	0	0	1*
Age-quadratic	0	0	0	0	0	0
Drug Use Ptn.	1	0	1	2	2	1
Trt. Type	2**	2**	2**	0	4**	0
Time in Trt.	4**	0	0	1**	0	2**
Individual Cells	9	7	12	8	13	12
TOTAL	26%	29%	25%	13%	22%	17%

Cumulative Multiple Correlations

	ACT.-	EMP.-	ALCOHOL	OPI.+U	NOP-D.	CRIM.
Covariate	.30	.41	.23	.11	.09	.13
Additional Factors:						
Ethnic Group	.32	.44	.28	.13	.17	.14
Age-linear	.32	.44	.31	.14	.17	.17
Age-quadratic	.32	.44	.31	.14	.17	.17
Drug Use Ptn.	.33	.44	.32	.19	.22	.19
Trt. Type	.36	.46	.36	.20	.31	.19
Time in Trt.	.42	.46	.36	.23	.31	.23
Individual Cells	.51	.54	.50	.36	.47	.42
TOTAL	.51	.54	.50	.36	.47	.42

F-Ratios and Degrees of Freedom

	ACT.-	EMP.-	ALCOHOL	OPI.+U	NOP-D.	CRIM.	DF
Covariate	78.92**	167.41**	47.51**	10.96**	7.24**	14.50**	1/813
Additional Factors:							
Ethnic Group	2.87*	5.52**	5.49**	.84	4.25**	.67	4/809
Age-linear	.19	.91	14.74**	1.69	.02	5.51*	1/808
Age-quadratic	.16	.25	.37	.11	.64	.00	1/807
Drug Use Ptn.	1.02	.48	.72	1.88	2.08	.80	8/799
Trt. Type	20.56**	16.93**	21.96**	.59	39.03**	.20	1/798
Time in Trt.	19.06**	.51	.52	5.76**	.01	8.08**	2/796
Individual Cells	.53	.48	.74	.40	.77	.67	142/654

* indicates $p<.025$

** indicates $p<.01$

TABLE 6

Differences in Treatment Means for MM Females Associated with Discriminating Factors

	N	Raw Mean Adm.	Raw Mean Trt.	Diff.	Trt. Mean Adjustment for Covariates
A. Productive Activities (-)					
2. Ethnic Group (1% addl. var.)					
Black -Older; higher DUP H+C, lower H+B, H+P, Poly; more MM-A; higher time in treatment.	518	1.77	1.53	-.2	.00
PR -Younger; higher DUP H+C, H+P; all MM-CO.	95	1.83	1.48	-.4	-.02
MA -Lower DUP H; all MM-A.	37	1.68	1.44	-.2	.01
White -Higher DUP LDO+, O OP+, lower H, H+C; 72% MM-A	154	1.62	1.41	-.2	.03
Other	11	1.73	1.36	-.4	.00
6. Treatment Type (2% addl. var.)					
MM-A	504	1.68	1.45	-.2	.00
MM-CO	311	1.84	1.57	-.3	.01
7. Time in Treatment (4% addl. var.)					
No. of Report Periods					
2	88	1.77	1.68	-.1	.01
3-5	197	1.76	1.53	-.2	.00
6	530	1.73	1.46	-.3	.00
B. Unemployment					
2. Ethnic Group (2% addl. var.)					
Black -Older; higher DUP H+C, lower H+B, H+P, Poly; more MM-A; higher time in treatment	518	3.65	3.39	-.3	-.02
PR -Younger; higher DUP H+C, H+P; all MM-CO	95	3.73	3.77	.0	-.05
MA -Lower DUP H; all MM-A.	37	3.76	3.48	-.3	-.07
White -Higher DUP LDO+, O OP+, lower H, H+C	154	3.24	3.03	-.2	.13
Other	11	3.46	3.52	.0	.05

TABLE 6 Continued

	N	Raw Mean Adm.	Raw Mean Trt.	Diff.	Trt. Mean Adjustment for Covariates
6. Treatment Type (2% addl. var.)					
MM-A	504	3.48	3.20	-.3	.06
MM-CO	311	3.75	3.66	-.1	-.10
C. Alcohol Use					
2. Ethnic Group (2% addl. var.)					
Black -Older; higher DUP H+C, lower H+B, H+P, Poly; more MM-A; higher time in treatment	518	1.64	1.52	-.1	-.02
PR -Younger; higher DUP H+C, H+P: All MM-CO.	95	1.33	1.32	.0	.03
MA -Lower DUP H; all MM-A	37	1.16	1.15	.0	.05
White -Higher DUP LDO+, O OP+, lower H, H+C; 72% MM-A	154	1.42	1.25	-.2	.02
Other	11	1.27	1.43	.2	.05
3. Age (2% addl. var.)					
0-17	8	1.00	1.22	.2	.01
18-20	121	1.33	1.18	-.2	.12
21-22	162	1.37	1.44	.1	-.08
23-25	172	1.55	1.36	-.2	.06
26-30	180	1.57	1.41	-.2	.07
31-40	136	1.88	1.70	.2	-.16
41-99	36	1.56	1.63	.1	-.03
Note: Younger are higher in DUP H+B, H+, H+P, Poly, lower in H; more younger in MM-A.					
6. Treatment Type (2% addl. var.)					
MM-A	504	1.56	1.36	-.2	-.02
MM-CO	311	1.50	1.54	.0	.03
D. Opioid Use					
7. Time in Treatment (1% addl. var.)					
No. of Report Periods					
2	88	3.47	1.94	-1.5	.04
3-5	197	3.74	1.89	-1.9	.00
6	530	3.73	1.76	-2.0	-.01

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TABLE 6 Continued

	N	Raw Mean Adm.	Raw Mean Trt.	Diff.	Trt. Mean Adjustment for Covariates
E. Non-Opioid Drug Use					
2. Ethnic Group (2% addl. var.)					
Black -Older; higher DUP H+C, lower H+B, H+P, Poly; more MM-A; higher time in treatment	518	2.01	1.45	-.6	.01
PR -Younger; higher DUP H+C, H+P; all MM-CO	95	2.62	1.66	-1.0	-.03
MA -Lower DUP H; all MM-A	37	1.81	1.15	-.7	.02
White -Higher DUP H+B+, O OP+, Lower H, H+C; 72% MM-A	154	2.18	1.58	-.6	.00
Other	11	1.91	1.46	-.5	-.01
6. Treatment Type (4% addl. var.)					
MM-A	504	2.08	1.36	-.7	.00
MM-CO	311	2.15	1.70	-.5	-.01
F. Criminality					
3. Age (1% addl. var.)					
0-17	8	2.63	1.28	-1.4	-.11
18-20	121	1.88	1.15	-.7	.00
21-22	162	2.02	1.10	-.9	.04
23-25	172	2.03	1.16	-.9	-.04
26-30	180	2.09	1.11	-1.0	-.01
31-40	136	2.21	1.06	-1.2	.02
41-99	36	2.19	1.13	-1.1	-.06
Note: Younger are higher in DUP H+B, H+, H+P, Poly, lower in H; more younger in MM-A.					
7. Time in Treatment (2% addl. var.)					
No. of Report Periods					
2	88	2.08	1.22	-.9	.00
3-5	197	2.10	1.15	-.9	.00
6	530	2.05	1.09	-.9	.00

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TABLE 7

Relationships of Patient Characteristics, Treatment Type, and Time in Treatment to the Criteria for the Males in DF (N=1121)

Percent of Variance Attributable to Each Effect

	ACT.-	EMP.-	ALCOHOL	OPI.+U	NOP-D.	CRIM.
Covariate	16.8**	15.8**	4.9**	15.5**	2.7**	7.5**
Additional Factors:						
Ethnic Group	2.7**	3.6**	.8	5.0**	.0	5.7**
Age-linear	.3	.4*	1.2**	.0	.4*	.0
Age-quadratic	.1	.1	.0	.0	.0	.0
Drug Use Ptn.	4.2**	3.3**	1.0	.9	.3	2.8**
Trt. Type	2.0**	1.7**	.8**	.2	.5*	.0
Time in Trt.	6.3**	4.9**	.1	.7**	.1	.8**
Individual Cells	1.1	2.5	4.4	4.2	4.9	3.3
TOTAL	33.5%	32.3%	13.2%	26.4%	9.0%	19.8%

Cumulative Multiple Correlations

	ACT.-	EMP.-	ALCOHOL	OPI.+U	NOP-D.	CRIM.
Covariate	.41	.40	.22	.39	.16	.27
Additional Factors:						
Ethnic Group	.44	.44	.24	.45	.16	.36
Age-linear	.45	.45	.26	.45	.18	.36
Age-quadratic	.45	.45	.26	.45	.18	.36
Drug Use Ptn.	.49	.48	.28	.46	.18	.40
Trt. Type	.51	.50	.29	.47	.20	.40
Time in Trt.	.57	.55	.30	.47	.20	.41
Individual Cells	.58	.57	.36	.51	.30	.45
TOTAL	.58	.57	.36	.51	.30	.45

F-Ratios and Degrees of Freedom

	ACT.-	EMP.-	ALCOHOL	OPI.+U	NOP-D.	CRIM.	DF
Covariate	226.61**	209.91**	58.00**	205.34**	30.76**	90.64**	1/1119
Additional Factors:							
Ethnic Group	9.31**	12.58**	2.40	17.67**	.09	18.34**	4/1115
Age-linear	4.50	6.15*	14.27**	.58	5.36*	.18	1/1114
Age-quadratic	.65	.49	0	0	.03	.19	1/1113
Drug Use Ptn.	7.72**	5.96**	1.45	1.57	.32	4.22**	8/1105
Trt. Type	29.98**	25.87**	9.47	3.24	5.23*	.63	1/1104
Time in Trt.	102.24**	75.17**	.97	9.97**	1.82	9.79**	1/1103
Individual Cells	.28	.63	.85	.90	.92	.68	62/1041

* indicates $p<.025$ ** indicates $p<.01$

TABLE 8

Differences in Treatment Means for DF Males Associated with Discriminating Factors

	N	Raw Means Adm.	Raw Means Trt.	Diff.	Trt. Mean Adjustment for Covariates
A. Productive Activities					
2. Ethnic Group (2.7% addl. var.)					
Black -Older; higher in DUP H+C; few in CO after 2 months.	363	1.65	1.65	.0	-.03
PR -Younger; more in DF-CO; lower in time in treatment.	57	1.81	1.85	.0	-.09
MA -Older; most in DF-A; longer trt.	92	1.62	1.63	.0	-.03
White -Younger; lower in DUP H, have most of Poly.	590	1.44	1.46	.0	.03
Other	19	1.58	1.42	-.1	-.01
5. Drug Use Pattern (4.2% addl. var.)					
H -Shorter time in trt.	252	1.73	1.75	.0	-.07
H+C	71	1.66	1.71	.0	-.05
H+B	41	1.68	1.60	-.1	-.04
H+	19	1.63	1.84	.2	-.05
H+P	76	1.59	1.67	.1	-.02
Poly -Longer time in trt.	155	1.43	1.38	-.1	.04
LDO+	380	1.43	1.43	.0	.04
OP+	20	1.55	1.53	.0	.04
NC	107	1.50	1.53	.0	.02
6. Treatment Type (2.8% addl. var.)					
DF-A	607	1.53	1.48	.0	.01
DF-CO	514	1.57	1.64	.1	-.01
7. Time in Treatment (6.3% addl. var.)					
No. of Report Periods					
1	540	1.62	1.73	.1	-.05
2-6	581	1.48	1.39	-.1	.04

TABLE 8 Continued

	N	Raw Means Adm.	Raw Means Trt.	Diff.	Trt. Means Adjustment for Covariates
B. Unemployment					
2. Ethnic Group (3.6% addl. var.)					
Black -Older; higher in DUP H+C; few in CO after 2 months.	363	3.20	3.20	.0	-.06
PR -Younger; more in DF-CO; lower in time in treatment	57	3.68	3.80	.1	-.23
MA -Older; most in DF-A; longer trt.	92	3.14	3.12	.0	-.05
White -Younger; lower in DUP H, have most of Poly.	590	2.86	2.68	-.2	.07
Other	19	3.11	2.43	-.5	-.03
5. Drug Use Pattern (3.3% addl. var.)					
H -Shorter time in trt.	252	3.37	3.39	.0	-.17
H+C	71	3.17	3.24	.1	-.14
H+B	41	3.22	3.23	.0	-.06
H+	19	3.05	3.34	.3	-.12
H+P	76	3.17	3.33	.2	-.10
Poly -Longer time in trt.	155	2.91	2.57	-.4	.11
LDO+	380	2.87	2.62	-.2	.09
O OP+	20	2.75	3.15	.4	.24
NC	107	2.81	2.82	.0	.12
6. Treatment Type (1.7% addl. var.)					
DF-A	607	3.00	2.75	-.2	.02
DF-CO	514	3.08	3.16	.1	-.03
7. Time in Treatment (1.7% addl. var.)					
No. of Report Periods					
1	540	3.16	3.35	.2	-.10
2-6	581	2.93	2.55	-.4	.10
C. Alcohol Use					
3. Age (1.2% addl. var.)					
0-17	145	1.55	1.18	-.4	.06
18-20	298	1.83	1.35	-.5	-.06
21-22	198	1.85	1.29	-.6	.05
23-25	197	1.78	1.32	-.5	.07
26-30	126	1.91	1.54	-.4	-.09
31-40	104	2.10	1.57	-.5	-.07
41-99	53	2.11	1.51	-.6	.04

TABLE 8 Continued

	N	Raw Means Adm.	Raw Means Trt.	Diff.	Trt. Mean Adjustment for Covariates
6. Treatment Type (.8% addl. var.)					
DF-A	607	1.83	1.44	-.4	-.01
DF-CO	514	1.84	1.27	-.6	.02
D. Opioid Use					
2. Ethnic Group (5% addl. var.)					
Black -Older, higher in DUP H+C; few in CO after 2 months.	363	2.98	1.90	-1.1	-.11
PR -Younger; more in DF-CO; lower in time in treatment	57	3.16	2.00	-1.2	-.15
MA -Older; most in DF-A; longer trt.	92	3.04	2.30	-.7	-.12
White -Younger; lower in DUP H, have most of Poly	590	2.14	1.33	-.8	.10
Other	19	2.00	1.80	-.2	.13
7. Time in Treatment (.7% addl. var.)					
No. of Report Periods					
1	540	2.81	1.80	-1.0	-.06
2-6	581	2.27	1.49	- .8	.06
E. Criminality					
2. Ethnic Group (5.7% addl. var.)					
Black -Older; higher in DUP H+C; few in CO after 2 months.	363	2.23	1.31	-.8	-.01
PR -Younger; more in DF-CO; lower in time in treatment.	57	2.12	1.62	-.5	-.01
MA -Older; most in DF-A; longer trt.	92	2.39	1.51	-.8	-.05
White -Younger; lower in DUP H, have most of Poly.	590	2.05	1.16	-.8	.02
Other	19	2.32	1.48	-.8	-.03

Conclusions and Future Plans

S. B. Sells

The preceding papers have presented evidence concerning retention of patients and outcomes during treatment for a sample of 12,297 opioid addict and habitual drug-using patients at 31 agencies reporting in the DARP network. The cohort of patients represents admissions between June 1971 and June 1972 (Year 3 of the Program) and the data analyzed were limited to the first 6 bimonthly Status Evaluation Reports, for the 12 months following admission. Every patient in the sample could have had up to 6 Status Evaluation Reports during the period covered, depending on the time spent in treatment; subsequent reports for those who continued in treatment are available in the master file, but were not used in the present studies.

The overall results obtained during treatment suggest that in a number of major respects the American taxpayer has received good value for his investment dollar from the Federal treatment system represented by the DARP agencies. The aim of this concluding presentation is to summarize and interpret the research results and to relate them to the concerns of policy makers as well as clinicians, taking into account the limitations of the data and the analyses performed.

With this in mind, it should be noted that the emphasis in the DARP program has been on specified outcomes for defined treatments for specified categories of patients. Using this strategy it is hoped that whatever has been learned may be applied in the future in the planning of new programs and modification of those currently in operation. Such application requires close and detailed scrutiny of the technical reports and specific recommendations would be inappropriate on this occasion. I will focus only on a few major issues.

Retention. The retention data analyzed by Joe and Simpson reflect some refinements in data management that should be understood if their results are compared with other information. Specifically, in the study summarized by Joe, time in treatment for Cohort 2 was calculated to reflect actual time during which the patient was reported as being in treatment status, and program admission and termination dates were adjusted accordingly. Thus a stricter definition was used for Cohort 2 than Cohort 1 and it is not yet clear to what extent differences in retention observed between the two cohorts reflect the change in definition and to what extent they reflect changes in program effectiveness. The results obtained indicate higher terminations and fewer still in treatment at 12 months for MM patients, essentially no change for TC patients, and higher retention of DF patients. A study is in progress to clarify these differences.

Even taking the Cohort 2 results at face value, however, there is a qualitative difference in patient retention between the MM and all other treatments. Whether the comparisons are taken at 3, 6, or 12 months, the percentage of patients still in treatment is significantly higher in MM treatments than in DF or TC treatments of comparable intended duration, the percentages reported as "completed" are higher in the other treatments than in MM, but this does not alter the picture. At 3 months, the percentage still in treatment in MM programs was 88, compared to 45 for TC and 53 for DF. At 6 months, the comparable percentages were 71 for MM, 31 for TC, and 28 for DF. And at 12 months, they were 46 for MM, 13 for TC and 8 for DF.

Assuming that treatment effects require that patients must remain in treatment at least for some minimum time, the question of what constitutes that minimum time gains importance in view of the losses within 12 months

in all treatments. While it has long been assumed that this is somewhere in the range of 6 to 12 months for the types of treatments we are discussing, the hypothesis that significant effects may be obtained in a shorter time is supported by at least two lines of evidence. The first is the fact, shown in Tables 1 and 2 of the Gorsuch paper, that most of the outcome effects realized occur by the time of the first Status Evaluation Report. Although further positive effects have frequently been realized with increased time in treatment and long-term patients have generally looked better on all reports, including pretreatment levels, than short-term patients the fact remains that the major changes obtained occur very early in the treatment process. The second line of evidence is a recently reported finding in a study of 24 TC's in New York City (System Sciences, Inc., 1973) that even short-term clients, who had been in treatment for less than a month, averaged 37% reduction in arrests, compared to pre-treatment, while those who remained 4 to 6 months had almost a 100% better chance of not being arrested than those who remained 1 to 3 months. Further post-treatment evaluation is needed to resolve this question.

The relatively high losses of patients during treatment also raise questions as to how they might be reduced. Joe and Simpson have shown that variations in retention and termination rates are related to many factors involving the match between patient characteristics and program characteristics. These are worth pursuing, both in relation to the matches that are indicated and as a source of problems requiring attention, such as that of the TC's, which retain older patients longer, but tend to have a majority of younger patients assigned.

Outcomes During Treatment. In the evaluation study reported by Gorsuch, gross changes from pretreatment to during treatment were examined

for all treatments on six outcome measures, followed by linear model, regression-variance analysis studies of three outpatient subsets for which sufficient data were available. The outcome measures, as defined by Demaree, were 1. productive activities, a measure combining legitimate employment with school attendance and homemaking, 2. unemployment, 3. alcohol use, 4. opioid drug use, 5. nonopioid drug use, and 6. criminal behavior.

As you have heard, the results were substantial and significant in the expected direction on drug use, both opioid and nonopioid, and on criminal behavior. Moderate reductions in alcohol use were found for the DF treatments and very small although also significant improvements on productive activities and employment were found for the MM treatments. These analyses were not appropriate for the TC and inpatient DT treatments and could not be performed for the outpatient DT.

The linear model analyses identified factors that accounted for significant portions of the variance in each of the criteria. As reported by Gorsuch, the pretreatment levels were extremely important factors in relation to productive activities, employment, and alcohol use in all three studies (MM males and females and DF males). In addition the portions of variance attributable to other factors (ethnic group, age-on alcohol only, treatment type, and time in treatment) were similar for these criteria in all three analyses. On the other criteria, opioid use, nonopioid use, and criminal activities, however, there were differences between the MM and DF results in respect to the importance of the pretreatment levels. The pretreatment levels accounted for a relatively small portion of criterion variance in MM and for a relatively large amount in DF. In addition significant

increments were found in MM attributable to ethnic group, drug use pattern (for females) treatment type, and time in treatment; in DF, on the other hand, with the exception of ethnic group on opioid use and criminal activities and of drug use pattern on criminal activities, the other factors showed no significant incremental effects.

As we interpret these results, they point up some essential differences between methadone and drug-free treatments. Methadone in maintenance doses operates directly on drug use and associated criminal activity (that is occupied largely with illegal drug behavior and the procurement of funds to support drug use). The chemical effects of methadone are effective over a considerable range of pretreatment levels of drug use and since the pre-treatment levels have little effect, the effects of other factors (ethnic group, treatment type, and time in treatment) are not obscured. In DF, on the other hand, there is no massive agent comparable to methadone, and the pretreatment level on each criterion becomes the major dimension on which the results are ordered. Because ethnic group and age are involved in the pretreatment levels, they are obscured by the massive pretreatment effects. Treatment type, we believe, is also confounded with ethnic group and age as far as these results are concerned.

At the same time it appears that the treatments with which we are concerned, MM and DF, have, in most cases, limited resources to affect employment, except by referral and appeal to other community agencies. The results for Cohort 2 are in agreement with those for Cohort 1 (Spiegel and Sells, 1973) in showing that such arrangements have not been effective. It is understood that recent measures have been implemented by NIDA to cope with this problem, but these would not be reflected in the present data.

With respect to alcohol use during treatment, it is believed that the results reflect at least in part varying attitudes of treatment program staffs and patients in different ethnic groups toward the consumption of beer. We have data on consumption of beer, wine, and liquor separately but regrettably did not use them in the study reported by Gorsuch because the evidence that would have decided this was not available earlier. Two recent studies by Demaree (Demaree and Neman, 1974, Demaree et al., 1974) as well as some earlier results by Simpson (Simpson, 1973) have shown significant differences in the implications of beer and wine drinking in the drug-abusing population.

My comments on the complex relations between treatment type and various patient classification variables, such as ethnic group, age, and pretreatment drug and alcohol use patterns, reflect the concern of our staff with the complexities encountered in the analysis of these data. The distribution of patients over treatments is most complete for Blacks who are also the largest ethnic group in the treatment sample, and reasonably good for Whites, who are second in number. Both Blacks and Whites are represented in all treatments, although differentially with respect to age and drug-use pattern. Unfortunately for the research design, Puerto Ricans, who were mainly in Puerto Rico where Spanish translations of the DARP forms were used, and Mexican-Americans, entirely in the Southwest, constituted much smaller groups and were specialized with respect to treatments. Puerto Ricans were almost entirely in MM-CO, with only a few stateside patients in MM-A, and most of those who were in DF were in DF-A; a large portion of the Puerto Ricans in TC were divided between a TC-T facility in Puerto Rico for women and a TC-M facility in Puerto Rico, for men. Whereas the Puerto Ricans were exposed predominantly to the change-

oriented outpatient treatments, the Mexican-Americans have similarly experienced mainly the adaptive approaches.

In addition the Mexican-American patients were the oldest ethnic group followed by Blacks and Whites, and the Puerto Ricans, the youngest. Older patients included higher percentages of daily heroin users, while younger patients, particularly Whites, included more polydrug users. Cocaine was used, in connection with heroin, mostly by Blacks, but also by Puerto Ricans.

These complex patterns make it difficult to distinguish between main effects and interactions, particularly when important variables are inadequately represented across treatment, age, ethnic and other categories. The decision to partition patients into sub-groups (or types), as in the Spiegel and Sells study, was abandoned for Cohort 2, first, because of the heterogeneity of the groups, and second, in order to avoid numerous small groups, in the analyses. However, the alternative of treating classification factors as discrete variables may have encountered problems of dependencies that may not be adequately controlled. In the Cohort 2 analyses, the sample was partitioned by sex because of differences in base rates on the criterion variables. It may be that further partitioning by race-ethnic group would enable more penetrating analyses by the regression-variance analysis method, without too great losses of sample size. At this time it appears that such analyses, to supplement those already completed, would be profitable.

The effects of these refinements in analysis would be mainly to clarify the sources of variance in the results obtained in treatment and to indicate more clearly the types of changes that might be made in the programming of patients through treatments to maximize outcomes. They

would not alter the overall assessment of outcome. Until this is done, however, it will be difficult to assign accurate weights to treatment type, ethnic group, age, drug use pattern, and time in treatment, in relation to outcome.

As to the overall evaluative results, however, it appears that the methadone probrams have the best marks, at least in relation to retention and outcomes during treatment. The record nevertheless leaves room for much improvement in the following respects: First, in retention, even including patients reported as referred to other programs and those reported as having completed treatment with those still in treatment, 45 percent of MM-A and 38 percent of the patients in MM-CO leave treatment before 12 months; until the post-treatment results are available, these losses may be regarded with suspicion. As we have already noted, the retention record of all other treatments is really poor. And second, in respect to rehabilitation; the noteworthy immediate effects during treatment are directly on drug use and drug use-related criminal activity. Analysis of the data on employment and productive activities suggests, as we found in Cohort 1, that the drug abuse treatment programs are not producing effectively in these areas. Finally, it appears, again in agreement with the Cohort 1 results, that the best results are being obtained with patients above the age of 22. The under 23 segment constitutes about 15% of the MM population, but between 40 to 50% of the patients in TC and DF treatment. As a whole, this group includes a high percentage of Whites, polydrug users, and individuals with no previous treatments, and presents a major challenge to the treatment community.

As I mentioned in my opening paper, the DARP group has completed three studies of addict deaths, for the years 1970-1971, 1971-1972, and 1972-1973. The overall death rates for these three years were 15 per 1000

per year for 1970-71, 12 for 1970-71, and 13 for 1972-1973. The rates for outpatient programs in each year were 2 to 3 times as high as for residential and inpatient programs, and even the lower rates are many times those for comparable age groups in the general population. Of the deaths recorded, between 72 and 80 percent in each year were attributable to violence and drug abuse-related causes. Suicide and homicide rates were particularly high. The hazardous life of the street addict involves even greater risks than that of addicts in treatment. The figures presented must also be kept in mind as we consider the various outcomes of treatment.

Finally, I would like to point out some issues that have not been addressed in the reports presented today. First, in relation to outcome measures, additional data are available on a large profile of patient background measures; Dr. Gorsuch did not have time to cover this. Second, Dr. Demaree and a group working with him have developed some important innovations in criterion measurement. This consists of pattern measures which indicate trends over time during treatment as well as elevation of scores. Using discriminant analysis, this group has completed some impressive studies of criminal behavior, opioid use, and employment of patients in MM treatment in the Cohort 2 sample. These results are included in technical reports and the measures will be implemented in the analysis of the third DARP Cohort, now in progress. Dr. Spiegel has also completed an analysis of group profiles of criterion measures over time, for samples of Cohort 2 patients who remained in treatment 12 months or longer. The time frame for this meeting made some exclusions unavoidable.

At this time the DARP staff is concerned principally with the during-treatment evaluation of Cohort 3 and with the post-treatment followup of

Cohorts 1 and 2. The during-treatment results are reflected in the design of the followup studies. This will make possible the approach to many questions that are presently unsupported by data. In particular we are interested in learning whether the positive results obtained during treatment are evidence of control, as some suspect, or of therapeutic change, as many believe.

Death Rates and Causes of Death Among Opioid Addicts in Community Drug Treatment Programs During 1970-1973

Olive Watterson
D. Dwayne Simpson
S. B. Sells

The hazardous life of the street addict involves many risks related to his precarious life style, including a high probability of premature death. Since variations in life style, associated with sex, age, race, and related factors reflect variations in risk, the study of differential death rates has great potential for increased understanding of addiction. Unfortunately efforts to estimate death rates have been hampered by difficulties related to the identification of base populations and calculations of time at risk.

The Drug Abuse Reporting Program (DARP), conducted at the Institute of Behavioral Research (IBR) at Texas Christian University under contract with the National Institute on Drug Abuse (NIDA) for research on the evaluation of treatment, has provided an exceptional opportunity for the study of addict deaths. The DARP utilizes an Admission Report that provides patient background and pretreatment

characteristics, and a bimonthly Status Evaluation Report on treatment participation and response to treatment that tracks each patient up to the point of termination. From this source, deaths during treatment are routinely reported and it is possible to compute accurately both time in treatment, which is equivalent to time at risk for the calculation of rates, and population characteristics for any subgroup for which rates are desired.

This method overcomes the disadvantages of unreliable base population estimates, but it tends to understate the true death rates for the addict population "in the street." The risk associated with surveillance by a treatment program is expected to be considerably lower than that experienced by drug users on their own in their daily routines. However, there are no reliable data on the number of addicts in the general population and no satisfactory ways to measure time at risk on an individual basis except in a data system such as the DARP.

The IBR staff and colleagues have completed three addict death studies of the DARP population in 3 successive years, June 1 to May 31, 1970-1971, 1971-1972, and 1972-1973. The results, summarized in this paper, reflect the dynamic quality of the drug scene in the United States during these years: it will be apparent that rates based on a single year might be misleading if generalized and that even with three data points, it is not yet clear whether the trends indicated are reliable.

The three studies are described in Table 1. The first study was based on the second full year of operation of the DARP, 1970-1971, during which 23 agencies were reporting. The second study, 1971-1972, included data from 36 reporting agencies, and the third, 1972-1973, involved data from 52 agencies, the maximum number in the DARP system.

Methods

The methods of evaluation used in the first study were replicated in each of the two succeeding studies to facilitate comparisons among the three sets of results.

Population Samples

The base samples consisted of all patients identified as opioid addicts in the DARP file who were either admitted to treatment or were continuing in treatment during the year spanned by each study. Opioid addicts were defined as patients who used opiate or synthetic opiate drugs daily at some time prior to admission to a treatment program. Opioid addicts who were reported as deceased during each year studied, made up the deceased samples.

Independent Variables

Death rates and causes of death were reported in these studies for the total samples and for subgroups defined by age, sex, race-ethnic status, and treatment modality. The variables were classified as follows:

TABLE 1

The Three DARP Studies Analyzing
Death among Opioid Addicts

Authors	Year	Base Sample		Deceased Sample
		No. of Agencies	No. of Patients	No. of Deaths
Sells, Chatham, & Retka (1972)	1970-1971	23	9,276	50
Watterson, Sells, & Simpson (1973)	1971-1972	36	17,684	91
Watterson, Sells, & Simpson (1974)	1972-1973	52	23,529	134

Sex: Male and Female.

Age: Under 18, 18-20, 21-25, 26-30, and Over 30.

Race-ethnic status: Black (B), Puerto Rican (PR), Mexican-American (MA), White (W), and Other (O).

Treatment modality: Methadone Maintenance (MM); Other Chemotherapy, involving maintenance drugs other than methadone (CT); Therapeutic Community (TC); Drug Free (DF); Withdrawal Only (WD); Mixed, involving any combination of the above categories with no one treatment predominating (MIX); and No Information or No Treatment (NINT) (The NINT group included patients who were admitted to treatment but for whom treatment information was not available on any bimonthly Status Evaluation Report; most of these never entered into treatment.)

Dependent Variables

Death rates. Death rates were computed to reflect the number of deaths per 1000 population per year at risk. Since risk was defined as equivalent to time in treatment during which patients were under the surveillance of the reporting program, the total time at risk for each subgroup analyzed was the total man-years in treatment for that subgroup. The death rate for any group was obtained by dividing the number of deaths by the total man-years at risk and multiplying the result by 1000.

Cause of death. The information reported enabled the classification of individual deaths into one of three categories: Violent, Drug-Abuse Related, and Other causes. These categories are defined as follows:

Violent. Deaths due to traumatic events, such as homicide, suicide, gunshot wounds, auto accidents, carbon monoxide poisoning, hanging, burns, falls, and fractures.

Drug-Abuse Related. Deaths due not only to an overdose of drugs, but those attributed to anaphylactic shock and deaths associated with chronic drug abuse, such as alcoholism, cirrhosis, hepatic coma, hepatitis, and emboli formed from talc.

Other Causes. Deaths attributed to cerebral vascular accidents, cardiac conditions, kidney failure, pulmonary emboli, pleural effusion, leukemia, cancer, infections, cellulitis, and other "natural" deaths for which drug abuse or violence could not be implied from the mortality report.

Information concerning causes of death, obtained from DARP Status Evaluation Reports, was supplemented by reports furnished by the Narcotic Addict Rehabilitation Branch of the National Institute on Drug Abuse.

The relationships between drug use, the activities related to obtaining drugs, the environment of a habitual opioid drug user, and the circumstances involved directly in that person's death, are very

complex. Deaths classified as Violent, for instance, frequently occur in the context of the individual's life style as a member of a drug culture, with the attendant risks (for instance, gunshot wounds, stabbings, and other homicidal events) involved in obtaining a daily supply of drugs, and may also result from specific incidents producing lowered perceptual abilities (auto accident, burns, falls, fractures). In addition, the interactions between the debility associated with addiction and factors involved in a death, other than those identified as Violent or Drug-Abuse related, cannot be estimated from the data available. Deaths attributed to Other causes, such as pulmonary emboli, pleural effusion, subacute bacterial endocarditis, and local or systemic infections, are examples of conditions which may in fact be sequelae to the use of street drugs of questionable composition (Baden, 1972; Louria, Hensle, and Rose, 1967).

The assignment of causal categories is necessarily an arbitrary procedure. Nevertheless, this method of analysis does call attention to the processes underlying the extremely high death rates within the addict population, and these data add to the accumulation of knowledge related to mortality among addicts, which will be necessary for evolving solutions to the problems in this area.

Results

Sample distributions

The last line in Table 2 shows the number and percent of patients

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TABLE 2

Comparison of Samples for Years 1970-1971, 1971-1972, and 1972-1973 by Number and Percent of Patients and Man-Years in Treatment for the Base Sample and the Deceased Sample with Death Rates

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Category	Number of Patients			Percent* of Patients			Man-Years in Treatment			Percent of Man-Years			Number of Deaths			Percent of Deaths			Death Rate Per 1000		
	70-71	71-72	72-73	70-71	71-72	72-73	70-71	71-72	72-73	70-71	71-72	72-73	70-71	71-72	72-73	70-71	71-72	72-73	70-71	71-72	72-73
Sex																					
Male	7538	13915	18003	81	79	77	2703	5919	7842	82	80	77	43	84	107	86	92	80	16	14	14
Female	1738	3769	5526	19	21	23	584	1481	2280	18	20	23	7	7	27	14	8	20	12	5	12
Age																					
<21	1874	3871	4346	20	22	18	482	1290	1656	15	17	16	5	12	14	10	13	10	10	9	8
21-25	3084	6515	9023	33	37	38	961	2579	3739	29	35	37	9	20	50	18	22	37	9	8	13
26-30	1737	3238	4588	19	18	19	664	1457	2043	20	20	20	9	14	17	18	15	13	14	10	9
>31	2581	4060	5563	28	23	24	1181	2073	2683	36	28	27	27	45	53	54	49	40	23	22	20
Race																					
B	4949	9185	12003	53	52	51	1822	3983	5224	55	54	52	32	57	67	64	63	50	18	14	13
PR	1046	2066	2243	11	12	10	322	1114	1292	10	15	13	5	10	16	10	11	12	16	9	12
MA	723	1401	2304	8	8	10	337	648	1057	10	9	10	7	7	16	14	8	12	21	11	15
W	2467	4926	6675	26	27	28	768	1568	2421	23	21	24	6	17	34	12	19	25	8	11	14
O	91	206	304	2	1	1	37	86	127	1	1	1	0	0	1	-	-	1			
Treatment																					
MM	5082	8598	11465	55	49	49	2420	5281	6795	74	71	67	44	81	97	88	89	72	18	15	14
MX	4	99	110	<1	<1	<1	1	14	21	1	1	<1	0	0	0	-	-	-			
XX	1256	1907	2367	12	11	10	359	665	944	11	9	9	2	0	1	4	-	1	6		
XF	1145	3706	5250	12	21	22	193	682	1323	6	9	13	2	9	28	4	10	21	11	13	21
MF	222	282	145	2	1	<1	40	72	8	1	<1	<1	1	0	0	2	-	-			
MXF	1168	1790	2298	13	10	10	137	284	379	4	4	4	0	1	8	-	1	6			21
MIX	287	1302	1894	3	7	8	109	443	651	3	6	6	1	0	0	2	-	-			
OTS	212	0	0	2	0	0	28	0	0	1	0	0	0	0	0	-	-	-			
Total	9276	17664	23529				3287	7400	10121				50	91	134				15	12	13

*Percents are rounded to the nearest digit

and of man-years in treatment, the number and percent of deaths, and the death rates, for each of the 3 years studied. The same data are shown for subgroups defined by Sex, Age, Race-Ethnic group and Treatment Classification. In each of the 3 years, the greatest proportions of patients were classified as Male, Black, 21 to 25 years old, and in MM programs. The man-years in treatment in the three base samples were 3,287, 7,400, and 10,121, respectively. These reflected average times spent in treatment of .35 man-years during 1970-1971, .42 man-years during 1971-1972, and .43 man-years during 1972-1973. These averages include patients in all of the treatments shown in the lower part of the table. The numbers of deaths, by year, were 50, 91, and 134, respectively. The greatest proportions of deaths were accounted for by Males, patients over 30 years old, Blacks, and patients in MM programs.

Death Rates

The death rates varied differentially in respect to each of the independent variables included, as well as across years (Table 2). Death rates for Males during 1970-1971 were 16 per 1000, and in both succeeding years were 14 per 1000. The Female death rate in 1970-1971 was 12 per 1000; it decreased in 1971-1972 to 5 per 1000, and then returned in 1972-1973 to 12. The average man-years in treatment for Males in the 3 years was .36, .43, and .44, respectively. For Females, the average man-years in treatment increased from .34 in 1970-1971 to .39 in 1971-1972, and .41 in 1972-1973.

The average man-years in treatment for all age groups increased across the 3-year period and a trend of decreasing death rates was noted for all age groups except the 21 to 25 subgroup. The death rates for this subgroup increased from 9 per 1000 in 1970-1971 to 13 per 1000 in 1972-1973. The greatest decrease in death rates (from 14 per 1000 to 8 per 1000) occurred among the 26 to 30 year old patients. Both the youngest (under 21 years) and the oldest (over 30 years) patient groups showed a constant decrease of one death per 1000 per year.

Whites were the only race-ethnic group with an increase in death rates across all 3 years. The White death rate in 1970-1971 was 8 per 1000; in 1971-1972, 11 per 1000; and in 1972-1973, 14 per 1000. In contrast to the Whites, the trend in the Black group showed a continuing decrease in death rates over the 3 years from 18 per 1000, to 14 and then to 13. The rates for both Puerto Ricans and Mexican-Americans increased from 1971-1972 to 1972-1973, but this increase did not compensate for the large decrease in rates for both groups which occurred between 1970-1971 and 1971-1972. Viewed across the 3-year period, death rates for Puerto Ricans decreased from 16 per 1000 to 12 per 1000 and for Mexican-Americans from 21 per 1000 to 15 per 1000. Average man-years in treatment for the Black, Puerto Rican, and White groups in the base sample increased over the 3-year period, while the Mexican-American and Other groups maintained a relatively stable average in all 3 years.

Thus, the trend among Whites was one of continuing increase in death rates and increase in average time spent in treatment, while the decrease in death rates among the remaining groups was accompanied by a corresponding increase in average time spent in treatment.

Death rates within treatment programs showed an unexpected contrast over time. There was a pronounced increase across the 3 years for patients in DF and a corresponding decrease for patients in MM. The year 1972-1973 was the first year that the number of deaths for patients classified as NINT were great enough to compute death rates. The NINT group was made up primarily of individuals who dropped out of treatment very early, and the rate of death was 21 per 1000, which was equal to the rate for patients in DF. The overall death rates for the 3 years were 15 per 1000 in 1970-1971, 12 per 1000 in 1971-1972, and 13 per 1000 in 1972-1973.

In summary, over the 3 years studied there was a substantial increase in the death rate for patients in DF treatment and a decrease in the rate for patients on MM. Death rates increased among White patients and decreased among Blacks. They increased in the 21 to 25 age range and decreased in all other age groups, although they were still highest in the over-30 group in 1972-1973. Trends across the 3 years did not appear to be a function of average time spent in treatment by the subsamples observed. The greatest increase in percentage of patients, in the 21 to 25 age and in the DF treatment subsamples, occurred in 1971-1972; while the most marked increases

in death rates occurred in 1972-1973. Apparently, size of base sample is also unrelated to death rate.

Causes of Death.

Percentages of deaths classified as Violent, Drug-Abuse Related, and Other within each patient category are shown for the 3 years studied in Table 3. Deaths reported with unknown causes are not included in this table, but the percentages were computed on the basis of total subsamples, including unknown causes. The percentages of deaths classified as Violent remained relatively constant across the 3 years. Drug-Abuse Related deaths decreased from 41% in 1970-1971 to 31% in 1971-1972, and increased slightly in 1972-1973 to 33%. Percentages of deaths attributed to Other causes showed no stable trend.

Within the Violent category, the most pronounced trend was an increase in the percentages among Whites, from 31% to 38%. In the Drug-Abuse Related deaths, the percent of deaths in the under-21 group increased from 22 to 36, and in the over-30 group the proportion of Drug-Abuse Related deaths decreased from 48% to 26%. Puerto Ricans and Whites both had a large decrease in Drug-Abuse Related deaths. The proportion of Drug-Abuse Related deaths among Puerto Ricans decreased from 60% to 31% and the proportion of Drug-Abuse Related deaths among Whites decreased from 54% to 44%. In the MM programs the percentage of deaths which were Drug-Abuse Related decreased from 41% to 26% across the 3 years. One definite trend

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TABLE 3

Distribution of Deaths Reported in the 1970-1971, 1971-1972, and 1972-1973 Samples by Cause of Death for Sex, Age, Race, and Treatment Categories. (Deaths reported as unknown cause are not included)

Patient Category	Causes of Death: Violent						Drug Abuse Related						Other Causes					
	1970-1971		1971-1972		1972-1973		1970-1971		1971-1972		1972-1973		1970-1971		1971-1972		1972-1973	
	No.	Percent*	No	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Sex																		
Male	27	40	35	42	44	41	28	41	27	32	33	31	13	19	22	26	25	23
Female	3	-	3	-	8	31	2	-	1	-	11	42	1	-	3	-	7	26
Age																		
<21	4	44	8	67	6	43	2	22	4	33	5	36	3	33	0	-	2	14
21-30	13	62	16	47	32	48	7	33	12	35	25	37	1	5	6	18	7	10
>30	13	30	14	31	14	26	21	48	12	27	14	26	10	23	19	42	23	43
Race																		
B	17	40	24	42	24	36	17	40	16	28	21	31	9	21	17	30	19	28
PR	1	20	6	60	6	37	3	60	4	40	5	31	1	20	0	-	5	31
MA	8	62	2	29	8	50	3	23	2	29	3	19	2	15	3	43	5	31
W	4	31	6	35	13	38	7	54	6	35	15	44	2	15	5	29	3	9
O	0	-	0	-	1	-	0	-	0	-	0	-	0	-	0	-	0	-
Treatment																		
MM	25	41	35	43	41	43	25	41	23	28	25	26	11	18	23	28	25	26
TC	0	-	0	-	0	-	2	-	0	-	1	-	1	-	0	-	0	-
DF	3	-	3	-	6	21	1	-	4	-	17	61	0	-	2	-	4	14
NINT	0	-	0	-	5	56	0	-	1	-	1	11	1	-	0	-	3	-
WD	1	-	0	-	0	-	2	-	0	-	0	-	1	-	0	-	0	-
MIX	1	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-
Total	30	41	38	42	52	39	30	41	28	31	44	33	14	19	25	27	32	24

*Percents are rounded to the nearest digit

was noted in the Other category. The proportion of deaths among patients over 30 years old increased from 23% to 43%. These are trends that need to be monitored for several additional years.

In regard to specific causes of death, the homicide and suicide rates for the combined 3-year DARP samples was 375 and 63 per 100,000, respectively, or almost 45 times the 1971 homicide rate for the United States, and over 5 times the suicide rate (Statistical Abstract of the United States, 1973).

Discussion

The rates and causes of death among opioid addicts who were in treatment during 3 years (June 1, 1970 to May 31, 1973) of the DARP file were investigated in this study. The largest subsamples of patients in the base sample were Male, 21 to 25 years old, Black and in MM programs. The profile of the deceased sample of 275 patients was similar except that the deceased patients were generally older.

Death Rates

In a comparison of death rates for each year, several trends were noted. Death rates increased from 9 to 13 for the 21 to 25

age group and decreased from 14 to 8 for patients in the 26 to 30 age group. Although an increase in average time in treatment was reported for Blacks, Puerto Ricans and Whites, the Whites were the only race-ethnic group with an increase in death rates. Death rates increased for DF patients and decreased for patients in MM. Because the basic composition of the DARP samples changed considerably over these 3 years in conjunction with the expanding number of agencies reporting to the DARP and changing governmental guidelines regarding treatment policies, interpretations of these trends in death rates must be made with caution. For example, death rate of 21 per 1000 for patients classified as NINT was based on only four deaths which occurred during the third year. However, since no deaths occurred during the first 2 years among patients in this category, it suggests that the increasing activity of outreach programs may be tapping a source within the addict population not yet sufficiently motivated to subject themselves to the rigors of treatment.

The death rate for the total combined 3-year sample was 13 per 1000. A rate this high was not reached in the mortality statistics for the United States population until age 57 (Statistical Abstract of the United Stated, 1973).

Causes of Death

The analysis of the causes of deaths among the addict sample clearly demonstrates the risks involved in illicit drug use. Each

year, 72 to 81% of the deaths were attributed to Violent and Drug-Abuse Related causes, as compared to 19 to 27% of the deaths due to Other causes. The proportion of Violent deaths remained fairly stable across the 3 years, however, the Drug-Abuse Related deaths decreased 10% from 1970-1971 to 1971-1972, and remained at essentially this level during 1972-1973.

The greatest increases in Violent deaths were noted in the White race-ethnic group, however, this group had the smallest proportion of Violent deaths for the 3 years combined, as compared to the remaining race-ethnic groups. The two Spanish-speaking groups, Puerto Rican and Mexican-American, had 20% and 62%, respectively, of their deaths accounted for by violence in 1970-1971, but in 1971-1972 the percentages reversed: Puerto Rican, 60%; and Mexican-American, 29%. During 1972-1973, the percentage of deaths attributed to violence appeared to average out for the Puerto Ricans, but the Mexican-Americans were highly represented. When the samples for all 3 years were combined, Mexican-Americans had the highest proportion of Violent deaths, 50%, as compared to Blacks, 40%, Puerto Ricans, 42%, and Whites, 38%.

The percentage of Drug-Abuse Related deaths decreased for all race-ethnic groups, for Males, and for the MM treatment programs. It was interesting to note that within the age groups the proportion of Drug-Abuse Related deaths increased for both younger groups, but decreased for patients over 30 years old. This suggests that the

older addicts may be more sophisticated in obtaining drugs, since the percentage of Violent and Drug-Abuse Related deaths for this group were steadily decreasing during the 3 years observed, and the proportion of deaths attributed to Other causes, primarily reflecting long term effects, have increased from 23% to 43%. Another contingency to be considered is that the younger addicts were more likely to be polydrug users and therefore were exposed to the interaction effects which may occur if more than one drug is used concurrently (Watterson, Sells, & Simpson, 1974; Roizen, Helpern, Baden, Kaufman, & Akai, 1972). The increase in Drug-Abuse Related deaths among the youngest group from 22% to 36% was probably reflected in the 61% of the DF deaths reported as Drug-Abuse Related. Recent governmental regulations regarding age and previous treatment episodes tend to increase the number of young patients assigned to DF programs.

Summary

Death rates and causes of death among opioid addicts in 52 community treatment programs reporting to the DARP were compared for 3 consecutive years. The greatest proportion of patients in the base samples were Male, 21 to 25 years old, Black, and in MM programs. The 275 patients in the deceased sample presented essentially the same profile, with the exception that the older patients

were more highly represented among the deceased. Several trends were indicated across the 3 years, notably increases in death rates for Whites, addicts 21 to 25 years old, and patients in outpatient DF programs. Consistent decreases in rates each year were found for Blacks, patients in the 26 to 30 age range, and patients in MM programs. Violent and Drug-Abuse Related causes combined accounted for 72 to 80% of the deaths each year, as compared to 19 to 27% of the deaths due to Other causes. The greatest increases in Violent deaths were noted in the White race-ethnic group. The percentage of Drug-Abuse Related deaths decreased for all race-ethnic groups, for Males, and for the patients in MM programs. An increase in Drug-Abuse Related deaths was found among patients under 30 years old. The patients over 30 years old had the greatest increase in deaths due to Other causes, and also the greatest proportion of deaths attributed to Other causes for the 3 years combined.

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Patterns of Arrests Among Drug Users During Treatment

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Research Problem and Method

Many studies have pointed to a sharp reduction in criminal activities upon entry into drug treatment programs. Frequently cited also are statistics which suggest that criminal behavior remains at a generally low ebb during treatment. The present study endeavored to add to such findings by taking a close look at several indicators of criminality in a large sample of outpatients during the first 6 months of treatment, with particular attention to patterns of arrests during treatment.

Method

Sample

The sample came from drug users admitted into treatment over a one-year period, starting June 1, 1971, at 31 different agencies under the Drug Abuse Reporting Program. For purposes of this study all patients who were in outpatient methadone maintenance or drug-free programs and remained in treatment for at least 6 months were included. Thirteen patients were dropped, however, for incomplate data on arrests, leaving a final sample of 3483 patients.

The characteristics of the sample are depicted in Table 1. Males made up three-fourths of the sample. About one-third were 21-25 years of age; the remainder were about equally divided among patients under 21, 26-30 and over 30 years of age. Blacks accounted for about half the sample; Whites and Puerto Ricans for approximately 20% each; and, Mexican-Americans for 7%. A

TABLE 1

Sex, Age, Ethnic Group, and Treatment Type Among 3483 Outpatients Who Remained in Treatment for 6 Months or Longer

	N	%
Male	2666	76.6
Female	817	23.4
Under 18	146	4.2
18-20	480	13.8
21-22	583	16.7
23-25	734	21.0
26-30	685	19.7
31-40	603	17.4
Over 40	252	7.2
Black	1776	50.9
Puerto Rican	666	19.2
Mexican-American	244	7.0
White	741	21.3
Others	56	1.6
Methadone Maintenance	3096	89.0
Drug Free	387	11.0
Total	3483	100.0

small group consisting of less than 2% of the patients, was labeled "Others." Approximately nine out of ten were in methadone maintenance programs, while the remaining tenth received drug-free outpatient treatment. Excluded from the sample were patients who were in residential programs, such as therapeutic communities and who therefore had little or no opportunity to commit criminal acts.

Data of the Study

The data for the present study came from the Admission Record and bimonthly status reports which were submitted for each patient by the agency for each 2-month period in treatment. Detailed information about these reports and the measures which were constructed can be found elsewhere (Demaree & Neman, 1974). Brief information concerning the variables employed in the present study follows.

Jail. For each intreatment period of 2 months, index values for Jail represented the number of days spent in jail: 1 = 0 days in jail; 2 = 1-2 days; 3 = 3-10 days; and, 4 = more than 10 days in jail during the period.

Illegal activities as a source of support. If illegal activities were reported as a patient's major or minor source of support during a 2-month period, an index value of 2 was assigned; otherwise a 1 was coded. This variable may be referred to as Illegal Support.

Arrests. Available for intreatment periods only, the Arrests variable was determined by totaling the number of times during each 2 months that a patient was arrested for gambling or running

numbers, prostitution or pimping, stealing or forging, drug violations, and crimes against persons. Index values of 1 to 4 represented 0, 1, 2, and over 2 arrests, respectively.

In certain of the analyses, categories of arrests are considered. Due, however, to the infrequent occurrence of arrests for gambling or running numbers, and prostitution or pimping, these were combined with stealing and forging to make up the category, crimes of profit.

Note should be taken here that the present data did not include arrests for minor offenses, such as disorderly conduct, vagrancy, drunkenness, failure to provide family support, and motor vehicle violations. The reason for this was that the bimonthly report form which was in use at the time much of the data were collected did not provide for arrests to be reported under such charges as just mentioned. These were included, however, in a revision of the report form and will be analyzed in future research.

Criminality. The Criminality variable was based on the presence or absence of three criminality indicators. For each 2-month period in treatment, the indicators were one or more arrests, one or more days in jail, and illegal activities as a source of support. Index values of 1, 2, 3, and 4 corresponded respectively to 0, 1, 2, and 3 indicators present.

Six additional variables reflected patient background characteristics. Age at the time of admission was represented by index values 1-7 as follows:

1 under 18
2 18-20
3 21-22
4 23-25
5 26-30
6 31-40
7 over 40

Sex was indicated by a code of 1 for male and 2 for female. The four ethnic group variables were Black (2 = Black; 1 = all others), Puerto Rican (2 = Puerto Rican; 1 = all others), Mexican-American (2 = Mexican-American; 1 = all others), and White (2 = White; 1 = all others).

Analysis of Data

Most of the analyses in the present report are descriptive in nature and are based on simple statistics, such as the percent of patients arrested during particular periods in treatment or the correlations among criminality variables. The present data on the prevalence of illegal support, arrests, and jail as a function of the period in treatment and the sex, age, and ethnic identity generally did not lend themselves to chi-square tests or the customary analyses of variance. For this reason, nonparametric tests were made. Patterns of arrests over the first 6 months in treatment were investigated by a method of hierarchical cluster analysis (Ward, 1963).

Results

Prior to considering the patterns of arrests, information will be presented on the pretreatment criminality of the present sample of patients, the distribution of criminality indicators during treatment, relationships among the criminality variables, and the relationships between arrests and demographic variables.

Pretreatment Criminality

The Admission Record for each patient contained information about legal status at admission, total number of prior arrests, total number of convictions, and length of time incarcerated. Based on other research with DARP data (Sells, 1974), it is known that criminal histories differ sharply according to the ethnic identity, sex, and age of patients. Although such relationships were not examined systematically in the present sample of patients they were abundantly evident and will be commented on briefly.

About one-third of the patients had a legal status, such as probation (13.2%) or parole (5.0%), or some legal action pending, such as awaiting trial (11.5%) or other (1.8%). Although legal status did not appear to differ with age, about 7% more males than females had some kind of special legal status. A particular legal status was reported for only 13.0% of the Puerto Ricans, compared to 43.9% of the Mexican-Americans.

In the total sample, 23.4% were reported to have had no prior arrests, and 16.3% had been arrested only once, but 11.4% were reported to have been arrested more than ten times. As expected,

the percent of patients with no prior arrests declined with age, while the percent with four or more arrests increased with age. About 20% of the males had no arrests, compared to 36% of the females; also, the 13.1% of males with more than ten arrests was twice as great as the 6.5% of females. Again, the Puerto Ricans and Mexican-Americans were the most different of the ethnic groups; 37.3% of the Puerto Ricans had no arrests, compared to 11.0% of the Mexican Americans.

Slightly over half (51.8%) of the patients had been convicted of a crime. Convicted only once were 19.1%. Convicted two or three times were 17.4%, while 7.6% had more than five convictions. The relationships between the number of convictions and demographic variables were much the same as for arrests. The percent of patients with one or more criminal convictions were 42.6 for Puerto Ricans, 52.5 for Whites, 54.3 for Blacks, and 58.7 for Mexican-Americans. Among males, 56.5% had been convicted, compared to 36.6% among the females. About three-fourths (75.4%) of the 857 patients who were over 30 years of age had been convicted, compared to 29.4% of the 630 patients who were 20 years of age or under.

A considerable number of patients in the present sample had been incarcerated for long periods of time. Among the 857 patients who were over 30 years of age, 43.6% had spent more than 3 years in confinement. In the sample at large, 58.0% had spent one or more days in jail, but as expected this percent rose with age. For example, in the 21-22 year old group, 46.3% had spent some time in jail, but this rose to 64.3% in the 26-30 year old group. Thus the experience of having spent some time in jail by patients

in their later twenties was 18% commoner than by patients in their early twenties. Among males, 63.8% had been confined, compared to 43.3% of the females; 20.3% of the males had spent over 36 months in jail, but this was true for only 8.2% of the females. A pronounced difference in incarceration was found for Mexican-Americans, compared to other ethnic groups; 83.2% of the 244 Mexican-Americans had spent some time in jail, and 33.6% had been confined for over 36 months. While the Puerto Rican group had the lowest percent of patients with time in jail (49.5%), this group had the next-to-the-highest percent of patients with over 36 months in jail (20.4%).

Indicators of Criminality During the First 6 Months in Treatment

For each 2-month period, three indicators of criminality were available for each patient. These were the total number of arrests, the number of days in jail, and illegal activities as either a major or minor source of support. The latter indicator was also available for the 2-month period preceding entry into treatment.

Illegal activities as a source of support. As can be seen in Table 2 , 39.5% of the patients were reported to have had an illegal source of support during the pretreatment period. During the first 2 months in treatment the percent of patients so reported dropped to 5.8, but did not decline further during the next two periods in treatment.

TABLE 2

Number and Percent of 3483 Patients Reporting Illegal Activities as a Major or Minor Source of Support During the Pretreatment Period and the First 6 Months in Treatment

	Illegal Activites Reported as:			
	Major Source		Minor Source	
Time Period	N	%	N	%
Pretreatment	1041	30.3	318	9.2
First 2 months	96	2.8	106	3.0
Second 2 months	58	1.7	133	3.8
Third 2 months	68	2.0	117	3.3

Arrests. The percent of patients arrested one or more times during each of the three 2-month periods spanning the first 6 months in treatment was surprisingly constant. As can be seen in Table 3, this was 2.6% in the first two periods and 2.8% in the third. Constancy over the three periods was shown also for the percent of patients with given numbers of arrests.

Days in jail. As can be seen in Table 4, the percent of patients who spent one or more days in jail increased slightly from 2.6% in the first 2 months to 3.0% in the second period and 3.6% in the third. Although, as will be discussed later, this trend did not continue beyond the first 6 months in treatment, the prevalence of time in jail did hold steady at about 3.6% during the second half of the first year in treatment.

With respect to the amount of time in jail, shown in Table 4, patients who were in jail for more than 10 days during given periods spent an average of 30 days in jail. Further examination disclosed that about one-third of these patients were reported to have had no arrests during the 2-month period in which time was spent in jail. There are several explanations for this. For some patients, incarceration in jail carried over from one period to another. None of the patients in the present sample, however, were in jail more than 40 days during two periods in succession; such patients, 35 in number, were excluded from the file of 12,297 patients which served as a source for the present sample. In addition, it is generally the case that patients who are incarcerated are terminated due to their unavailability for treatment. Inasmuch as all the patients in the present sample remained in treatment

TABLE 3

Percent of 3483 Patients and Mean Number of Arrests per 2-Month Period by Index Values for Total Arrests During the First 6 Months in Treatment

Time Period	Percent of Patients by Index Value				Mean Number of Arrests by Index Value			
	1	2	3	4	1	2	3	4
First 2 Months	97.4	2.1	0.3	0.2	0	1.0	2.0	4.43
Second 2 Months	97.4	2.2	0.3	0.1	0	1.0	2.0	3.80
Third 2 Months	97.2	2.3	0.3	0.2	0	1.0	2.0	4.83

Key to Index Values:

1 0 arrests per 2-month period
2 1 arrest
3 2 arrests
4 >2 arrests

TABLE 4

Percent of 3483 Patients and Mean Days in Jail per 2-Month Period by Index Values for Jail During the First 6 Months in Treatment

Time Period	Percent of Patients by Index Value				Mean Days in Jail by Index Value			
	1	2	3	4	1	2	3	4
First 2 Months	97.4	1.1	0.8	0.7	0	1.3	5.6	29.9
Second 2 Months	97.0	1.2	0.7	1.1	0	1.4	5.9	32.7
Third 2 Months	96.4	1.7	1.2	0.7	0	1.3	5.3	30.6

Key to Index Values:

1 0 days in jail per 2-month period
2 1-2 days
3 3-10 days
4 >10 days

for at least 6 months without termination, prolonged stays in jail are ruled out.

A strong association, as expected, was found between prevalence of arrests and time in jail. The probability that during a given 2-month period a patient who was arrested one or more times would spend one or more days in jail was 0.61, 0.77, and 0.86, respectively, for the first three periods. Expressed in numbers, 54 of the 89 patients who were arrested during the first 2 months also spent time in jail, in the second 2 months, the corresponding figures were 70 out of 91, and in the third period, 83 out of 97.

Criminality composite. The distribution of the Criminality composite for the pretreatment period, appearing in Table 5, is strikingly different than the distributions of this variable during the intreatment periods and deserves comment. First, only 26 or 0.8% of the 3483 patients resided mainly in jail during the pretreatment period. Second, 76.6% of the patients had one or more arrests prior to entry into treatment. Third, as shown previously in Table 2 , 39.5% of the patients were reported to have had an illegal source of support during the 2-month pretreatment period. To have been included among the 17.3% with a pretreatment index value of 1, a patient would have had none of these indicators.

During the three periods covering the first 6 months in treatment, 8.7% had one or more indicators of criminality during the first and third periods, while 8.4% were so reported in the second 2-month period. Again, just as with the distributions for each indicator, the Criminality composite also showed no

TABLE 5

Percent of Patients with Given Index Values for Criminality During the Pretreatment Period and the First 6 Months in Treatment

Time Period	Percent of Patients by Index Value				Index Value	
	1	2	3	4	Mean	S.D.
Pretreatment	17.3	49.2	33.2	0.3	2.164	.700
First 2 Months	91.3	6.7	1.7	0.3	1.110	.385
Second 2 Months	91.6	6.3	1.6	0.5	1.111	.402
Third 2 Months	91.3	6.2	2.1	0.4	1.117	.412

Based on three indicators of criminality as follows:

For the pretreatment period - one or more previous arrests; jail reported as primary residence during pretreatment period; and, illegal activities reported to be a source of support during the period.

For each intreatment period - one or more arrests during the period; one or more days in jail during the period; and, illegal activities reported to be a source of support during the period

Key to Index Values:

1 No indicator reported
2 One indicator reported
3 Two indicators reported
4 All three indicators reported

appreciable trend on the average over the first 6 months in treatment.

Relationships Among Criminality Variables

Appearing in Table 6 are correlations among the criminality variables within given periods and across periods. Included also are correlations between the 14 criminality variables and six variables representing the ethnic identity, sex, and age of the patients.

For each intreatment period, the variables are Jail, Illegal Support, Arrests, and a composite of these three, Criminality. For the pretreatment period, only Criminality and Illegal Support are given. For given periods in treatment, the correlations between the three variables and the composite ranged from 0.616 to 0.730. Jail and Arrests within the three periods, in order, were correlated 0.511, 0.585, and 0.663. The apparent increase in strength of this relationship over the three periods is in keeping with the conditional probabilities of time in jail, given one or more arrests, which were 0.61, 0.77, and 0.86.

The dichotomous variable, Illegal Support, had low correlations with Jail and Arrests within given periods. Across periods of time, however, Illegal Support, showed strong correlations with itself. Between the first and second 2-month periods, this correlation was 0.587, but it was still 0.331 between the first and third periods. Illegal Support in the second and third periods was correlated 0.569.

TABLE 6

Correlations Among Criminality Variables for the Pretreatment Period and the First Three Periods in Treatment, Including Correlations with Demographic Variables, Based on 3011 Outpatients With Complete Data (Decimal Points Omitted)

	(1) Criminality Pretreatment														
(2)	784	(2) Illegal Support Pretreatment													
(3)	150	028	(3) Criminality 1st 2 Months												
(4)	086	074	653	(4) Jail 1st 2 Months											
(5)	122	106	674	067	(5) Illegal Support 1st 2 Months										
(6)	086	077	660	511	099	(6) Arrests 1st 2 Months									
(7)	122	090	413	203	422	129	(7) Criminality 2nd 2 Months								
(8)	070	043	232	237	120	127	724	(8) Jail 2nd 2 Months							
(9)	121	104	391	050	587	025	673	152	(9) Illegal Support 2nd 2 Months						
(10)	057	037	196	170	094	140	679	585	108	(10) Arrests 2nd 2 Months					
(11)	110	066	192	119	193	060	365	215	364	166	(11) Criminality 3rd 2 Months				
(12)	075	033	086	135	016	041	186	215	057	147	730	(12) Jail 3rd 2 Months			
(13)	089	066	226	053	331	040	403	114	569	086	616	081	(13) Illegal Support 3rd 2 Months		
(14)	066	037	065	068	014	042	160	168	054	163	724	663	091	(14) Arrests 3rd 2 Months	
(15)	122	100	015	014	002	019	-026	-018	-034	-012	-014	008	-019	008	(15) Black
(16)	-131	-045	-045	-029	-031	-035	-016	-025	-009	003	-010	-023	016	-020	(16) Puerto Rican
(17)	073	020	068	053	068	012	105	131	069	051	079	060	057	014	(17) Mexican-American
(18)	-047	-082	-016	-022	-012	-001	-010	-031	013	-014	-013	-018	-023	008	(18) White
(19)	-136	-053	-001	002	-017	026	-022	-014	-023	-009	-033	-026	-016	-013	(19) Sex
(20)	179	029	005	-003	011	-007	017	025	008	010	038	042	030	032	(20) Age

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The across-period correlations for Jail and Arrests were low in value. For adjoining periods these values ranged from 0.140 to 0.237, but dropped to 0.042 for Arrests and 0.135 for Jail between the first and third periods. Values much higher than these, but not as high as the across-period correlations for Illegal Support, were taken by the correlations between the Criminality composite in different periods. These results indicate that the stability of Criminality over time in treatment is due largely to the Illegal Support variable.

The correlations between the criminality and demographic variables were either low or negligible in value. Even so, it is worthy of note that the correlations were positive in direction between the Mexican-American ethnic variable and the criminality variables, whereas they were generally negative for the Puerto Rican and White groups. Directionality was mixed for Blacks. These results suggest that Puerto Ricans and Whites had fewer indicators of criminality on the average during treatment than did Mexican-Americans. This is borne out also by other investigations of outcomes over time in treatment (Demaree, Neman, Long, & Gant, 1974).

Relationships Between Arrests and Demographic Variables

Results are presented in this section for the percent of patients arrested in the three periods, broken down by ethnic group, sex, and age. Following this, results are presented for arrests under the categories of crimes of profit, drug violations, and crimes against persons.

Arrests, by period in treatment and ethnic group. The percent of patients in each of the four ethnic groups who were arrested one or more times during each of the three intreatment periods are shown in Fig. 1. The result which stands out is that the percent of Mexican-Americans who were arrested was higher than for any other ethnic group in all three periods. In the first and third 2-month periods, Puerto Ricans had the lowest percent of patients arrested. Also, it might be noted that the ordering of the groups according to the percent of patients arrested was the same for the first and third periods.

Separate chi-square tests, with 3 degrees of freedom each, were made between arrested versus not arrested and the ethnic groups for given periods in treatment. The chi-square values and their probability levels for the three periodr in order were as follows: $\chi^2 = 6.80$, $p = .08$; $\chi^2 = 9.94$, $p = .02$; and, $\chi^2 = 3.36$, $p = .34$. A test of the hypothesis of no differences in arrest rates among ethnic groups per 2-month period during the first 6 months in treatment was made in terms of the S statistic, based on Friedman rank sums, as described by Hollander and Wolfe (1973). Under the null hypothesis, the probability of obtaining as large an S as the observed value of 7.55 was .03. Based on this result, the alternative hypothesis was accepted that the arrest rates of the ethnic groups are not all equal. With respect to this outcome, attention is drawn to the Mexican-Americans, inasmuch as the arrest rates in the Mexican-American group of 4.5, 5.7, and 4.5% for the three periods, respectively, were consistently higher in the present sample than the arrest rates for the other ethnic groups, with an average of 2.2, 2.4, and 2.6%.

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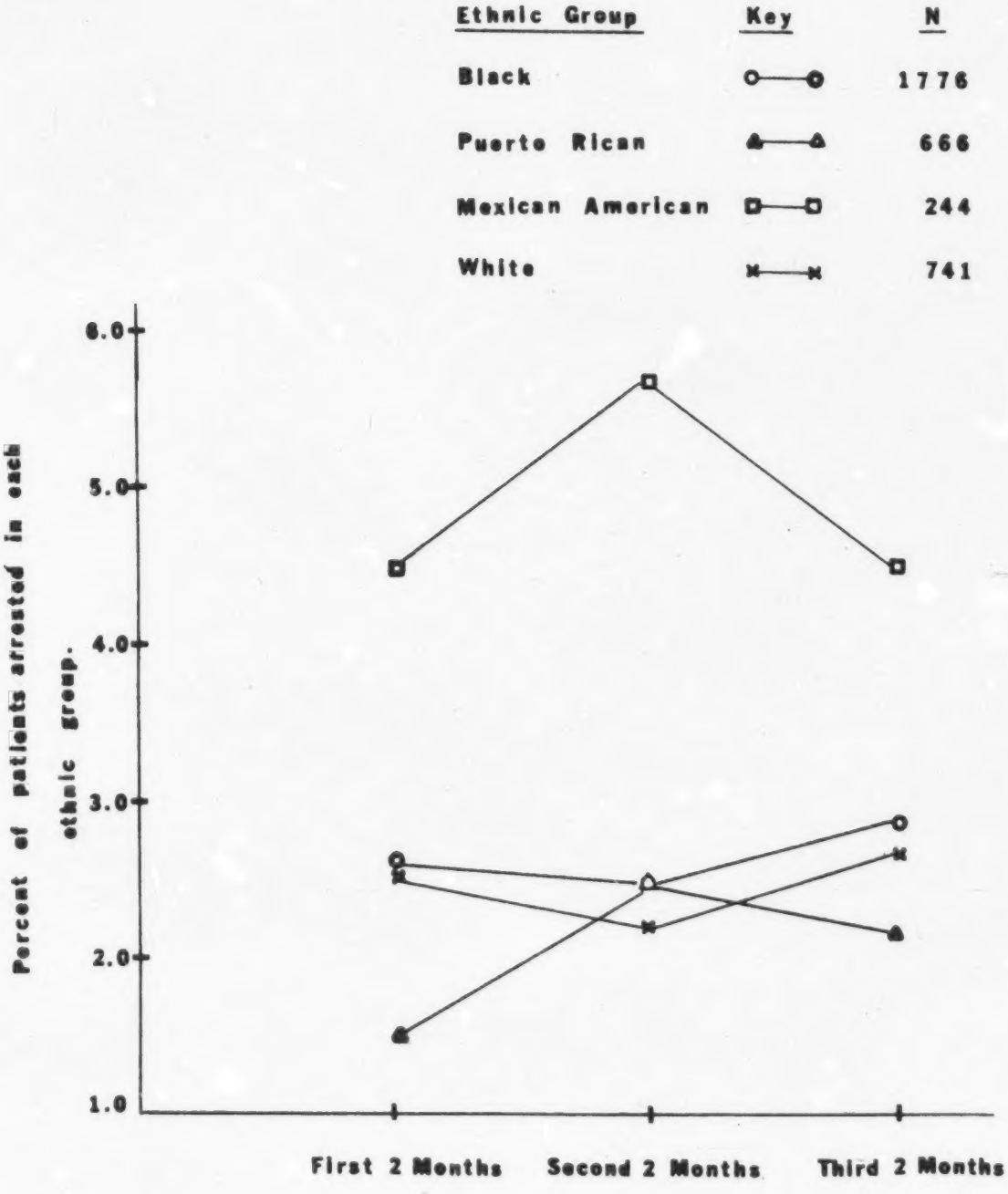

Fig. 1 Percent of patients in each ethnic group arrested per 2-month period during the first 6 months in treatment.

Arrests, by period in treatment and sex. The percent of patients arrested in the first, second, and third periods were 2.5, 2.6, and 2.8, respectively. Over the three periods the average percent arrested per period was 2.7 for males and 2.4 for females. These results offer no evidence that arrest rates differ by period or by sex. When arrest rates were examined for males and females in given 2-month periods, however, the results shown in Fig. 2 were obtained.

The first question which was asked was whether the evidence supports an association between sex and arrests in given periods. The chi-square values and their probability levels, based on 1 degree of freedom, for the three periods, respectively, were as follows: $\chi^2 = 1.69$, $p = .20$; $\chi^2 = .70$, $p = .41$; and, $\chi^2 = 2.69$, $p = .10$. Although none of these chi-square values permitted the hypothesis of independence to be rejected, the uneven marginal distributions represented by the percent arrested versus non-arrested and the percent of males versus females imposed upper limits on both the chi-square value and the associated phi coefficient. The latter is the product-moment coefficient of correlation between two binary or 1, 0 variables, and as is well known, the maximum attainable value of this coefficient may be sharply limited by the differences in the marginal distributions. In the case of the sex-by-arrests data for the third period, the phi coefficient (based on females = 1, males = 0, and arrested = 1, not arrested = 0) had a value of -0.028. The maximum attainable value in the negative direction (given that 2.8% of the patients had been arrested and thus had a score of 1 on the arrest variable,

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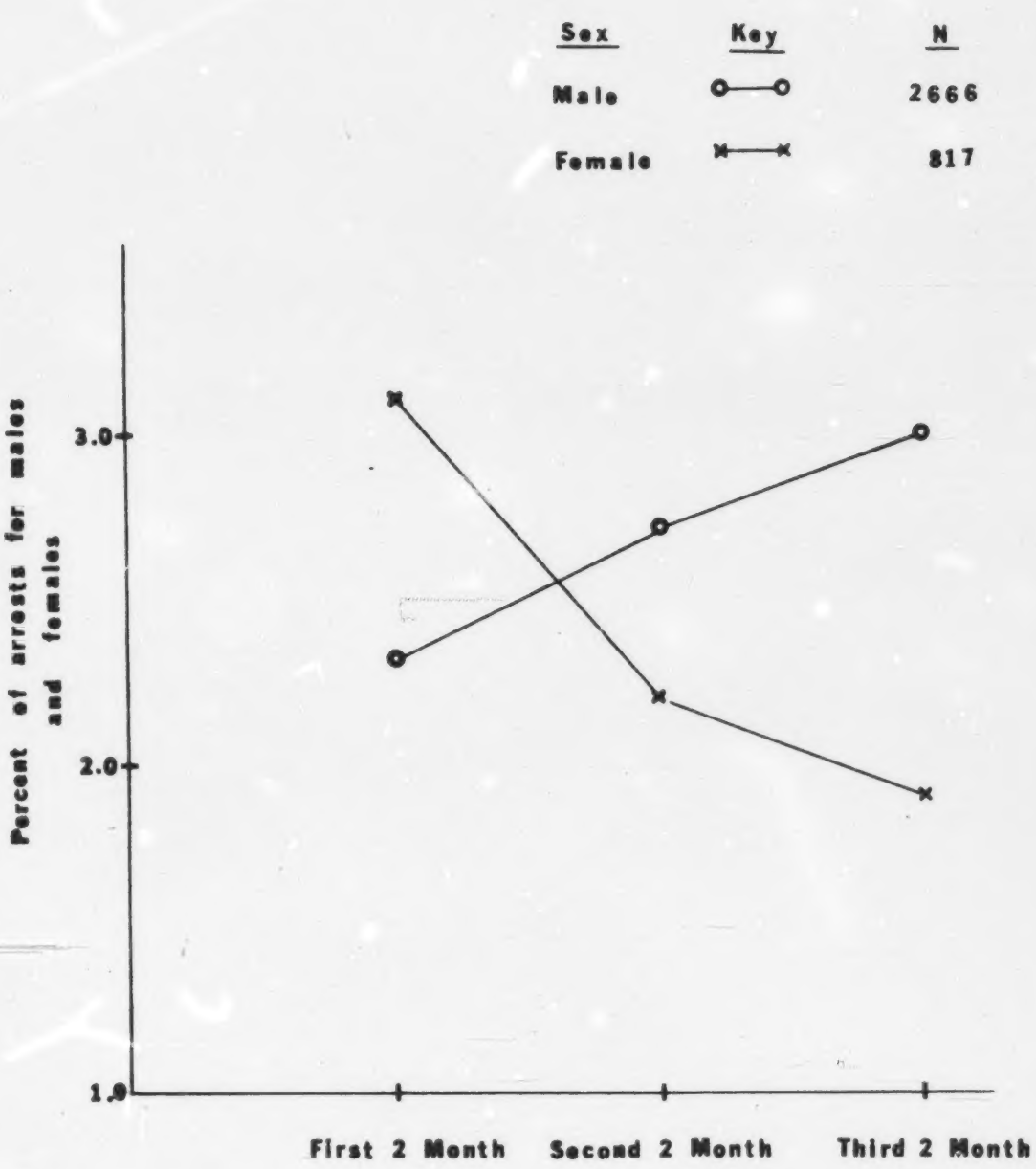

Fig. 2 Percent of patients arrested for each sex group per 2-month period during the first 6 months in treatment.

and that 23.4% of the sample were females) was only -0.094. Following Johnson (1945), it is suggested that the signed ratio of the observed value to its maximum attainable value, which was -0.297 in the present instance, gives a more realistic indication of the strength of the association. The standard error of this ratio (Demaree, 1950) in the present instance was 0.182 under the assumption that the value of the ratio in the populat. is zero. The observed value thus is 1.63 standard errors emoved from a value of 0. With reference to the normal distribution, a difference as large as this has a probability of .106. This is virtually the same probability as was found for the chi-square value of 2.69.

A similar result was obtained for the arrest-by-sex correlation in the first period. The observed phi coefficient of 0.022 was compared with its maximum value of 0.293. The ratio, ϕ/ϕ_{max}, had a value of .075, with a standard error of .058. With an observed value removed 1.30 standard errors from zero, the probability of as great a difference under the hypothesis of independence was 0.171. This result is almost the same as was obtained with the chi-square value of 1.69 which had a probability of .20.

The preceding results leave doubts about the association, if any, between arrests and sex. In particular, there is doubt regarding the second question to be asked of the present data. This question is whether the decrease in the arrest rate for females and the increase in arrest rate for males over the three periods is reliable. If the arrest-by-sex correlation had been convincingly positive in the first period and negative in the third

period, an affirmative answer would have been indicated. Another approach taken to the question at hand was an analysis of variance of the binary scores for arrests by sex and time period. This analysis yielded an F-ratio of 2.69 for the sex-by-time period interaction, which had a probability less than 0.10 for 2 and 6962 degrees of freedom. Although this result suggests that the trends in arrests may differ over the first 6 months in treatment, the present data are not well suited to a variance analysis. It thus appears wise to withhold conclusions concerning the very enticing results portrayed by Fig. 2, and await an opportunity to replicate the present analysis with other samples of patients.

Arrests, by period in treatment and age. The percent of patients in each of seven age categories who were arrested per 2-month period is shown in Fig. 3. As can be seen, the 23-25 year old group had the highest arrest rate in all three periods. The group of patients under 18 had the lowest arrest rate during the first two periods and the next-to-the-lowest during the third period. Both the 31-40 and over 40 age groups showed an increase in arrest rate over the three periods, while the 26-30 year old group showed a decline. The question to be asked about these results is whether they are reliable in the sense that they would be likely of confirmation in random samples from the same population as is represented by the present sample.

The first approach to the foregoing was to test the hypothesis of independence between arrests and age by computing the chi-square values for each of the three periods in treatment. These values and their associated probability levels, based on 6 degrees of freedom, were as follows: $\chi^2 = 10.38$, $p = .11$; $\chi^2 = 4.52$,

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Age Groups	Key	N
Under 18		146
18-20		480
21-22		583
23-25		734
26-30		685
31-40		603
Over 40		252

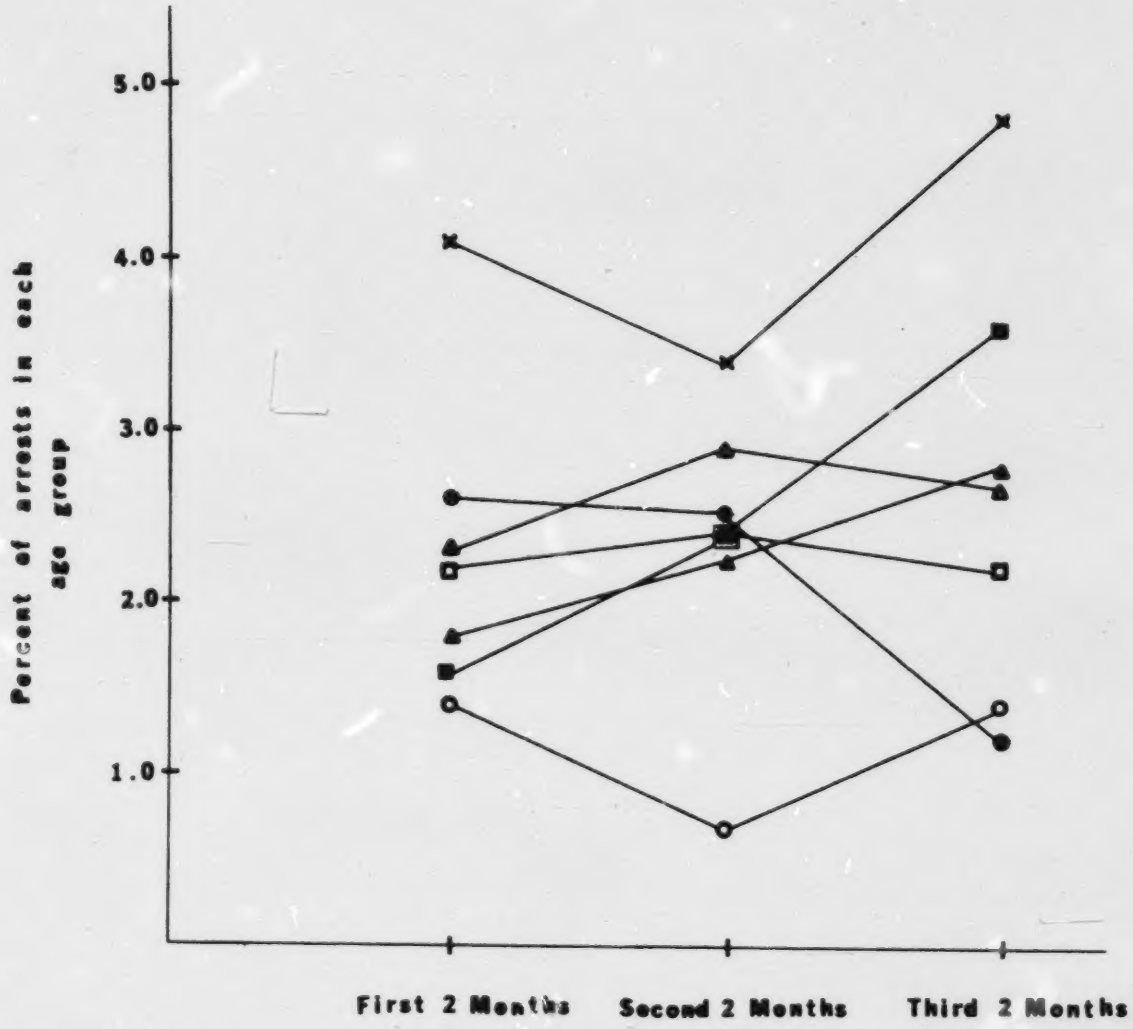

Fig. 3 Pecent of patients in each age group arrested per 2-month period during the first 6 months in treatment

$p = .61$; and $\chi^2 = 19.61$, $p = .003$. The second approach was to test the hypothesis of no difference in arrest rates among the age groups per 2-month period during the first 6 months in treatment. This test was made using the S statistic, based on Friedman rank sums (Hollander & Wolfe, 1973). The observed value of S of 10.428 fell between the .05 and .10 probability levels under the null hypothesis. This result, together with an F-ratio significant at the .05 level, based on an analysis of variance of the binary variable for arrests, inclines the present investigators toward rejecting the null hypothesis, primarily on the basis of a higher arrest rate by the 23-25 year old patients.

The trends toward increasing or decreasing arrest rates over the first three periods for particular age groups were intriguing, but of questionable reliability based on the relatively low prevalence of arrests, small numbers of patients in the age groups, and the low correlation of the Arrests variable from one period to the next. As a case in point, the increase in the percent of arrests in the over-40 group from 1.6% in the first period to 3.6% in the third period represents an increase from 4 to 9 of the 252 patients in this group who were arrested in these two periods. It may be obvious that little or no confidence can be placed on this result in the absence of verification in other samples of patients.

Arrests Under Different Categories of Charges

In the bimonthly status report on each patient, the number of arrests was reported for each of several categories. Two of these, gambling or running numbers and prostitution or pimping

were reported infrequently and were combined with stealing or forgery to form a category called "crimes of profit." The other categories were "drug violations" and "crimes against persons."

The number and percent of patients arrested one or more times under the above categories of charges is shown in Table 7 for each 2-month period. Arrests for crimes against persons were less frequent than arrests for drug violations, and the latter were less frequent than arrests for crimes of profit. For none of the three categories was there any indication of a trend upward or downward in the arrest rate over the first 6 months in treatment. Finally, it is apparent that the number of instances during given periods of patients being arrested one or more times under more than one category of charge was quite low. For example, during the first 2 months in treatment the total number of patients arrested under the three categories of charges was the sum of 52, 36, and 10 which equals 98. This is greater, by 9, than the total number of patients, 89, who were arrested irrespective of the charges. Thus, during the first 2 months in treatment there were only nine instances of patients being arrested under more than one category of charges.

Crimes of profit. During the first three periods in treatment, the 23-25 year old group had an arrest rate of 2.7, 2.0, and 3.1%, respectively, for crimes of profit. This group had an average rate of 2.6%, which was 1% higher than the average rate of any other age group. The lowest rates were observed in the under-18 and over-40 groups. The hypothesis of equal arrest rates for the seven age groups over the three periods was tested by the S statistic

TABLE 7

Number and Percent of 3483 Patients Arrested for Crimes of Profit, Drug Violations and Crimes Against Persons During the First Six Months in Treatment

Percent Shown in Parentheses

Category	First 2 Months	Second 2 Months	Third 2 Months
Crimes of Profit	52 (1.5)	59 (1.7)	57 (1.6)
Drug Violations	36 (1.0)	24 (0.7)	34 (1.0)
Crimes Against Persons	10 (0.3)	16 (0.5)	12 (0.3)
All Categories	89 (2.6)	91 (2.6)	97 (2.8)

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(S = 10.3; df = 6, p = .11). While this result was equivocal, the chi-square test for the third period was not. The chi-square test of independence between the prevalence of arrests for crimes of profit in the 23-25 year old group versus all other age groups yielded a chi-square value of 12.95, which was significant beyond the .01 probability level, with 1 degree of freedom.

Differences of note were not observed in the prevalence of arrests for crimes of profit among the ethnic or sex groups.

Drug violations. None of the 146 patients in the under-18 age group were arrested for drug violations during the first 4 months in treatment. Among the 252 patients in the over-40 group, 3 or 4 patients were arrested on drug charges during each 2-month period. The arrest rates for the other age groups varied in slight ways, but were not notably different.

With respect to sex, the drug arrest rate for females declined from 1.2% in the first period to 0.5% in the next two periods, while the rate for males was about 1.0% during all three periods.

In contrast to the slight differences in relation to age and sex, the prevalence of arrests for drug violations differed considerably among the four ethnic groups. The Mexican-American group, with an arrest rate during the three periods of 1.6, 2.8, and 2.0%, had the highest prevalence of any of the ethnic groups in all three periods. The Puerto Rican group had the lowest prevalence in two of the three periods. These differences were considered to be significant (S = 7.00, df = 3, p = .05).

Crimes against persons. Arrests for these charges were so infrequent that comparisons among different groups of patients could not be made reliably. An example is offered by the prevalence of arrests for crimes against persons in the Mexican-American group. During the first 2 months in treatment, 4 of the 244 Mexican-Americans were arrested on such charges. During the second 2 months only two patients in this group who were arrested for crimes against persons. Expressed as a percent of the patients in the group who were arrested on such a charge, the values of 1.6 and 0.8% are the two highest for any period or ethnic group.

The main finding from the study of arrests under different categories of charges was that the higher arrest rate in the 23-25 year old age group, which was described on page 23, appears to be associated primarily with arrests for crimes of profit.

Arrests for minor offenses. As previously mentioned on page 4, information about arrests for disorderly conduct, vagrancy, and other violations of a minor nature was not available in some of the bimonthly reports which were submitted for the present sample of patients. This information was available, however, for patients who were admitted into treatment during the second half of the year, starting June 1, 1971. For 1440 outpatients who remained in treatment at least 6 months and for whom the data in question were present, the prevalence of arrests for minor offenses during the first, second, and third 2-month periods in treatment was 1.8, 1.7, and 2.6%. For this sample of patients, the prevalence of arrests for crimes of profit, drug violations, and crimes against persons was 3.0, 3.3, and 4.3% for the three periods. Although

these results do not support the finding in a study by Maddux and McDonald (1974) of 100 opioid addicts that the majority of arrests during the year following admission were for minor offenses, the present data indicate that during the first 6 months in treatment arrests for minor offenses accounted for a bit more than half again as many arrests as occurred under all other charges.

Patterns of Arrests Over Time in Treatment

The pattern of arrests over the three 2-month periods for a patient was represented by his three index values on the Arrests variable. As the reader may recall, an index value of 1 signified no arrests, a value of 2 was assigned for one arrest, a 3 for two arrests, and a 4 for more than two arrests.

Among the 3483 patients, 234 or 6.7% were arrested one or more times during the first 6 months in treatment. Among these 234 patients, 160 or 68.4% were arrested only once during the 6 months. The three Arrest index values for each of the remaining 74 patients were entered into a hierarchical cluster analysis (Ward, 1963) to delineate the patterns of arrests. The pure forms of the patterns disclosed are given in Table 8.

Next in number to the patients who were arrested only once were the 27 or 11.6% of the 234 patients who were arrested once during two of the three periods. Next were the patients who were arrested more than once during a single 2-month period. These included 20 or 8.5% who were arrested twice, and 13 or 5.6% with more than two arrests in one of the periods. Three patients were arrested once during the second period and twice during the third

TABLE 8

Number and Percent of Individuals With Given Patterns of Arrests During the First Six Months in Treatment

	Time Period			Number of Patients with Pattern	Percent of 234 Patients with Pattern
	First 2 Months	Second 2 Months	Third 2 Months		
Pattern:	2	1	1	50	21.4
	1	2	1	48	20.5
	1	1	2	62	26.5
	1	2	2	10	4.3
	2	1	2	7	3.0
	2	2	1	10	4.3
	3	1	1	8	3.4
	1	3	1	7	3.0
	1	1	3	5	2.1
	4	1	1	6	2.6
	1	4	1	3	1.3
	1	1	4	4	1.7
	1	2	3	3	1.3
	*	*	*	11	4.6
Total:				234	100.0

*Includes patterns which pertained to one or two patients.

Key to Index Values:

1 0 arrests per 2-month period
2 1 arrest
3 2 arrests
4 >2 arrests

period. The remainder of the 234 patients included two with a 222, signifying a single arrest during each of the three periods and two with a 231, indicating one arrest during the first period and two arrests during the second period. The remaining seven patterns were as follows: 213, 321, 331, 431, 124, 142, and 144.

An examination of the ethnic composition, sex, and age of the 74 patients with multiple arrests failed to disclose anything unusual about these patients.

Illegal Sources of Support Over Time in Treatment

Although Illegal Support was a dichotomous variable (scored 2 if illegal activities were reported to have been a major or minor source of support during a given period, and scored 1 otherwise), it proved to be highly interesting as an indicator of criminality. As previously reported on page 15, Illegal Support had relatively high correlations from one period to the next, whereas the Arrests variable had low correlations. Neither of these measures showed appreciable change over the first 6 months in treatment. The percent of patients for whom illegal support was reported during the first three periods, in order, were 5.8, 5.5, and 5.3. During these three periods, 343 or 10.0% of the 3464 patients for whom data were available were reported to have had an illegal source of support during one or more periods. Half of these patients had illegal support during only one of the three periods; 109 or 31.7% of the 343 had an illegal source of support during two periods and 63 or 18.4% during all three periods.

Some other findings of interest were the following. A higher percent of males than females were reported to have been engaged in illegal activities during the first 6 months in treatment. For the first, second, and third 2 months, the percent of males with illegal support were 6.1, 5.9, and 5.7, respectively, and for females, 5.1, 4.3, and 4.3. The chi-square for the mean percent over the three periods had a value of 2.31 which is significant at the .14 probability level with 1 degree of freedom.

A much higher percent of Mexican-Americans were reported to have had an illegal source of support during the first 6 months in treatment than any other ethnic group. The percent of Mexican-Americans with illegal support during the first three periods were 11.1, 11.1, and 9.5. The remaining ethnic groups did not appear to differ in any consistent way; for these groups combined, the percent with illegal support in the three periods were 5.5, 5.1, 5.0.

Prevalence of Criminality Indicators Over the First Year in Treatment

The findings presented thus far have been limited to criminality prior to entry into treatment and during the first 6 months in outpatient treatment of a sample of 3483 patients. These patients were followed for 4, 5, or 6 two-month periods in treatment, depending on whether they were terminated. Approximately one out of every eight patients were terminated during the fourth 2-month period and likewise during the fifth period. Almost 70% were continued in treatment beyond the sixth period. It is of

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interest that during the second half of the first year in treatment, 73 or 2.1% of the 3483 patients were terminated due to incarceration in jail.

The reason for presenting the results separately for the first 6 months and the first year in treatment will be discussed later, but it has to do with the mixing of termination reports with continuation-in-treatment reports and with the shifting sample base as patients terminate. Nevertheless, the results for the second half of the first year in treatment do provide a comparison with the levels and trends observed over the first 6 months in treatment, and are therefore considered.

The percent of patients with an illegal source of support during the three periods covering the second half of the first year in treatment were, in order, 5.5, 5.2, and 4.8. The corresponding values for the first three periods were 5.8, 5.5, and 5.3. These results suggest that the prevalence of illegal activities as a major or minor source of support does not change over the first year in treatment.

The percent of patients arrested during the fourth, fifth, and sixth periods in treatment, respectively, were 2.9, 2.8, and 2.7. These percentages, together with the 2.6, 2.6, and 2.8% arrested during the first three periods, indicate that the prevalence of arrests is remarkably steady from one 2-month period to another over the first year in treatment.

With respect to the prevalence of time in jail, the reader may recall that the percent of patients who spent one or more

days in jail increased slightly from 2.6% in the first 2-month period to 3.6% in the third period. In the three periods covering the second half of the first year in treatment these percentages, in order, were 3.6, 3.7, and 3.1. These results lend no support to the already doubtful significance of the slight increase in prevalence of time in jail during the first six months in treatment, and are more in keeping with a conclusion that the prevalence of time in jail shows no trend over the first year in treatment. Such a conclusion is consistent also with the findings in an earlier cohort (Demaree, 1974).

Relationships Between Demographic Variables and Criminality Indicators Over the First Year in Treatment

The percent of patients with an illegal source of support in the six periods covering the first year in treatment revealed that Mexican-Americans had a higher prevalence of illegal support than any other ethnic group in all six periods. As shown in Table 9, however, the percent of Mexican-Americans with an illegal source of support declined from 11.1 in the first two periods to 8.3 and 7.1 in the fifth and sixth periods. A lesser decline in the prevalence of illegal support was found for Whites. A further finding of significance was that the prevalence of illegal support did not differ in any consistent way among the Black, Puerto Rican, and White ethnic groups.

With respect to the prevalence of arrests over the first year in treatment, the results in Table 9 offer no evidence of a trend in prevalence for any ethnic group, but again the

TABLE 9

Prevalence of Illegal Support, Arrests, and Time in Jail During the First Six 2-month periods for Each of Four Ethnic Groups and the Total Sample

Including Sample Size

Percent With Illegal Support

Ethnic Group	Period 1	2	3	4	5	6
Black	5.7	4.7	5.1	5.7	5.3	5.3
Puerto Rican	4.9	5.3	5.7	5.1	5.0	3.9
Mexican-American	11.1	11.1	9.5	7.9	8.3	7.1
White	5.7	6.1	4.6	4.8	4.3	3.7
Total	5.8	5.5	5.3	5.5	5.2	4.8

Percent Arrested

Ethnic Group	Period 1	2	3	4	5	6
Black	2.7	2.6	2.9	3.0	3.0	3.0
Puerto Rican	1.5	2.4	2.3	2.0	1.6	1.6
Mexican-American	4.6	5.8	4.6	5.0	5.1	3.8
White	2.6	2.2	2.7	3.0	3.1	2.3
Total	2.6	2.6	2.8	2.9	2.8	2.7

Percent With Time in Jail

Ethnic Group	Period 1	2	3	4	5	6
Black	3.1	3.3	3.6	3.9	4.1	3.6
Puerto Rican	1.7	2.1	2.4	1.6	2.4	2.0
Mexican-American	5.0	8.7	8.7	8.3	8.3	7.7
White	1.7	1.9	3.3	3.6	3.1	2.0
Total	2.6	3.0	3.6	3.6	3.7	3.1

Sample Size[1]

Ethnic Group	Period 1-4	5	6
Black	1776	1567	1375
Puerto Rican	666	587	518
Mexican-American	244	198	159
White	741	628	523
Other	56	43	41
Total	3483	3023	2616

[1]Due to missing data, actual sample sizes were somewhat less than indicated; for the total sample this was under 2%.

Mexican-Americans had the highest arrest rate in all six periods. Except for the second period, the Puerto Ricans had a consistently lower arrest rate than the other ethnic groups. Though there was little question of the outcome, the S statistic (see page 18) was used to test the hypothesis of no difference in arrest rates among the ethnic groups over the six 2-month periods. The value of 15.61 for S, with 3 degrees of freedom, was significant beyond the .01 level.

The results in Table 9 for the prevalence of time in jail are much the same as for the prevalence of arrests. An even sharper difference than with arrests appears to exist, however, between the percent of Mexican-Americans with time in jail and the percent of other ethnic groups who spent some time in confinement. The S statistic for these data had a value of 16.96 which was significant beyond the .01 level for the 3 degrees of freedom present.

Prevalence of criminality indicators, by sex. The prevalence of illegal activities as a source of support during the first 6 months in treatment was higher for males than females. As shown in Table 10, however, there was little difference between males and females in the prevalence of illegal support during the third and fourth 2-month periods. During the sixth period, 5.8% of the females were reported to have had an illegal source of support, compared to 4.4% of the males.

With respect to arrests, there was weak evidence, as previously discussed on page 20, of a differential trend in prevalence during the first 6 months for males and females. The

TABLE 10

Prevalence of Illegal Support, Arrests, and Time in Jail During the First Six 2-month Periods in Treatment, Shown Separately by Sex and the Total

Including Sample Size

Percent With Illegal Support

Sex	Period 1	2	3	4	5	6
Male	6.1	5.9	5.7	5.6	5.1	4.4
Female	5.1	4.3	4.3	5.4	5.3	5.8
Total	5.8	5.5	5.3	5.5	5.2	4.8

Percent Arrested

Sex	Period 1	2	3	4	5	6
Male	2.4	2.8	3.1	3.0	3.2	3.0
Female	3.2	2.3	2.0	2.6	1.8	1.6
Total	2.6	2.6	2.8	2.9	2.8	2.7

Percent With Time in Jail

Sex	Period 1	2	3	4	5	6
Male	2.7	3.2	4.0	3.3	4.5	3.7
Female	2.5	2.4	2.4	2.9	1.7	1.3
Total	2.6	3.0	3.6	3.6	3.7	3.1

Sample Size[1]

Sex	Period 1-4	5	6
Male	2666	2297	1987
Female	817	726	629
Total	3483	3023	2616

[1] Due to missing data, actual sample sizes were somewhat less than indicated; for the total sample this was less than 2%.

prevalence for females declined from 3.2% in the first period to 2.0% in the third, while a slight increase from 2.4 to 3.1% was shown by males during these two periods. In the second half of the first year in treatment, the females showed a further drop of 1% in prevalence of arrests, while the arrest rate for males held steady at about 3.0%. The pattern of these results suggests that females have a lower arrest rate than males over the first year in treatment.

The prevalence among females of time in jail was lower than for males over the time in treatment. This was particularly the case for the last 4 months of the first year. During the two periods covering these 4 months, 1.7 and 1.3% of the females spent one or more days in jail compared to 4.5 and 3.7% of the males.

Prevalence of criminality indicators, by age. The prevalence of arrests over the first six periods in treatment was compared over the seven age groups. As shown in Table 11, the 23-25 year old group had the highest prevalence of arrests during the first four periods and next to the highest during the last two periods of the first year in treatment. The under-18 group had the lowest arrest rate in five of the six periods. The next-to-the-lowest rate was taken in four of the six periods by the 252 patients who were over 40 years of age. The S statistic (see page 18) for these data had a value of 22.5 which was significant beyond the .01 level with 6 degrees of freedom.

The findings with respect to the prevalence of time in jail mirrored the findings for arrests. Over the first three periods

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TABLE 11

Prevalence of Illegal Support, Arrests and Time in Jail During the First Six 2-month Periods in Treatment, Shown Separately by Age Groups and the Total

Including Sample Size

Percent With Illegal Support

Age Group	Period 1	2	3	4	5	6
Under 18	2.7	0.6	2.0	2.0	2.5	3.0
18-20	6.0	2.3	3.4	4.8	4.9	5.7
21-22	5.1	2.4	4.9	4.8	4.6	3.2
23-25	7.5	5.9	7.0	7.0	6.6	5.8
26-30	4.9	3.2	4.9	5.6	5.7	5.2
31-40	6.4	3.6	4.8	4.8	3.2	3.3
Over 40	4.4	1.1	7.5	6.8	6.3	6.0
Total	5.8	5.5	5.3	5.5	5.2	4.8

Percent Arrested

Age Group	Period 1	2	3	4	5	6
Under 18	1.4	0.7	1.4	0.7	0.9	1.1
18-20	2.3	3.0	2.8	3.0	4.2	3.0
21-22	2.3	2.5	2.3	3.3	3.0	2.1
23-25	4.1	3.4	4.8	4.1	3.0	3.1
26-30	2.7	2.5	1.2	3.1	2.6	2.2
31-40	1.9	2.4	2.9	2.4	2.7	3.5
Over 40	1.6	2.4	3.6	0.8	1.8	2.0
Total	2.6	2.6	2.8	2.9	2.8	2.7

Percent With Time in Jail

Age Group	Period 1	2	3	4	5	6
Under 18	2.1	0.7	1.4	0.7	0.9	1.1
18-20	2.1	3.0	3.0	3.2	4.8	3.1
21-22	2.3	3.0	2.6	3.2	3.9	2.1
23-25	3.7	3.7	5.6	4.6	4.0	3.7
26-30	2.7	3.0	3.0	3.7	4.3	2.8
31-40	2.7	3.4	4.4	4.7	3.1	4.5
Over 40	1.6	2.8	2.8	2.0	3.2	2.6
Total	2.6	3.0	3.6	3.6	3.7	3.1

Sample Size[1]

Age Group	Period 1-4	5	6
Under 18	146	118	98
18-20	480	409	343
21-22	583	501	442
23-25	734	647	559
26-30	685	598	514
31-40	603	525	458
Over 40	252	225	202
Total	3483	3023	2616

[1] Due to missing data, actual sample sizes were somewhat less than indicated; for the total sample this was less than 2%.

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the 23-25 year old group had the highest percent of patients with one or more days in jail; during the second half of the first year in treatment this group had the next-to-the-highest percent during two periods and the third highest in the other. The under-18 group had the lowest prevalence of time in jail for all periods, except the first. Again, the over-40 group in all six periods had a relatively low percent of patients who were in jail for one or more days. The S value (see page 18) was 25.98 and was significant beyond the .01 level with 6 degrees of freedom.

Patterns of Criminality Over the First Year in Treatment

In a sample of 2824 methadone maintenance patients, drawn from the present sample, a series of studies (Demaree, Neman, Long, & Gant, 1974) was made of the relationships between differential outcomes over time in treatment and patient characteristics, pretreatment variables, and intreatment measures. In this research it was found that an illegal source of support during the 2-month pretreatment period was indicative of adverse outcomes for employment, alcohol consumption, and drug use during the first year in treatment. Illegal activities, arrests and time in jail during treatment were indicative of adverse outcomes for employment and drug use during the first year in treatment.

One of the above studies was based on the mean level and pattern of the Criminality composite over time in treatment. With respect to this composite of dichotomous variables for illegal support, arrests, and jail, 85% of the 2824 methadone patients displayed few, if any, indications of criminality during the time in

treatment. Next were 7% for whom the mean level of criminality indicators was low, but variable from one period in treatment to another, without an appreciable trend upward or downward. For over 5% the mean level was low, but steady over the time in treatment. Only 20 patients, or less than 1%, showed a decreasing pattern, while 16 patients showed an increasing pattern over the time in treatment. Finally there were 16 patients for whom two of the three criminality indicators were typically present during the 2-month periods in treatment.

Even though only 412 or 15% of the 2824 methadone patients showed appreciable indications of criminality during treatment, the following were clearly evident. The results are expressed in terms of correlations (N = 2824) between selected variables and a discriminant function which maximally separated the six criminality outcome groups, relative to the within-group dispersion. On this dimension the group with few or no indications of criminality was widely separated from the group with frequent indicators of criminality during treatment.

1. An illegal source of support during the 2-month pretreatment period was predictive (r = 0.332) of criminality over the first year in treatment.

2. Lack of gainful employment or engagement as a student or housewife during treatment was correlated 0.509 with criminality outcome. The extent to which patients were unemployed had a similar correlation of 0.452.

3. There was greater opiate use during treatment by the group of patients with frequent criminality indicators than by

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the groups of patients which had fewer indications of criminality. This applied particularly to heroin use, which correlated 0.543 with the criminality discriminant function.

4. The use of barbiturates and cocaine was associated with an adverse criminality outcome. These drug use variables correlated 0.356 and 0.472, respectively, with the criminality discriminant function.

With regard to ethnic differences, Mexican-Americans were over-represented, while Puerto Ricans were under-represented, among the 412 patients for whom there were appreciable indications of criminality over the time in treatment. Of the 412 patients, 9.5% were Mexican-Americans; in the remainder of the sample, 5.6% were Mexican-Americans. By comparison, 17.5% of the 412 were Puerto Ricans, but this group made up 22.6% of the 2412 patients in the remainder of the sample. These results, however, are unimpressive when cast into correlations. The correlation between the Mexican-American ethnic variable and the criminality discriminant function was only 0.158. The corresponding correlation for the Puerto Rican ethnic variable was -0.112.

Discussion and Conclusions

With a focus on illegal support, arrests, and time in jail as indicators of criminality, 3483 drug abusers were followed for the first 6 to 12 months in methadone maintenance or drug-free outpatient treatment at 31 different agencies participating in the Drug Abuse Reporting Program. The data available on each patient, admitted during a one year period starting June 1, 1971, consisted of an Admission Record and bimonthly status reports which were prepared by the agencies in interviews with the patients. Prior criminality, as indicated by arrests, convictions, and incarceration, was greatest for the Mexican-American ethnic group and the least for Puerto Ricans, while Blacks and Whites fell in between. Less criminality prior to admission was reported for females than for males, and as expected, a strong relationship to age was found. The ethnic and sex differences, just noted, were maintained in the prevalence per 2-month period of arrests (exclusive of arrests for minor offenses) and time in jail during treatment. No trends in prevalence were observed within ethnic groups over the time in treatment. There was a slight decline in the prevalence of arrests among females over the first year in treatment. The prevalence of illegal activities as a source of support was much higher for the Mexican-American group than the other ethnic groups, which did not differ appreciably.

Among seven age groups, the 23-25 year old group had the highest prevalence on all three criminality indicators during treatment. The under-18 and over-40 groups had the lowest.

Arrests for crimes of profit were more common among the 23-25 year olds than in any other group, while arrests for drug violations were more common in the Mexican-American group than in any other ethnic group.

Among the 3483 patients, 234 or 6.7% were arrested one or more times for other than minor offenses during the first 6 months in treatment. Only 41 or 1.2% were arrested during more than one 2-month period. During the first 6 to 12 months that 2824 patients remained in methadone treatment, only 15% showed any appreciable or recurring indications of criminality from one 2-month period to another. Among the three indicators of criminality, illegal activities as a reported source of support had a prevalence per 2-month period on the average of 5.5% and showed a strong tendency to carry over from one period in treatment to the next, but this was decidedly not the case for arrests or time in jail.

Although the prevalence estimates in the present study were considered to be conservative, for a number of reasons, the findings support the conclusion that arrests and brief periods in jail, by and large, are isolated events in the lives of individual patients. At the same time it was strongly evident that patients in different ethnic groups, who tended to come from different agencies, urban settings, and geographical regions, are exposed to different risks of arrests and time in jail.

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